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Organic Accelerators[1]

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Invention of Organic Accelerators Ranks in Importance with the Discovery of Vulcanization—Aniline the Original Accelerator Displaced by Substances Superior for the Purpose—Characteristics and Preferred Applications of Accelerators

ORGANIC accelerators of vulcanization are carbon-nitrogen compounds that under vulcanizing conditions expedite the combination of rubber with sulphur and produce physical properties of the vulcanized product much superior to those obtainable by vulcanization of rubber with sulphur alone or assisted by the presence of litharge, magnesia, etc.

The fact that aniline and other organic substances exert these effects upon rubber and its properties was discovered by George Oenslager in 1906, then chemist of the Diamond Rubber Co., Akron, O.[2] His invention marked an epoch in the technology of rubber no less important than Goodyear's discovery of vulcanization by sulphur. The adoption of accelerators in the rubber industry enlarged greatly the production possibilities of every piece of curing equipment used in rubber work. The gain in economy of plant operation, and improvement in the technical quality and durability of rubber products are benefits enjoyed by manufacturer and consumer that in tire service alone outstrips monetary evaluation.

Accelerator Classification

Several hundred organic chemical substances exert accelerating effect on the vulcanization of rubber. The list of those commercially available for practical compounding includes between 50 and 60. The chemical activity and physical properties of these are sufficient for every practical need of the rubber compounder. The choice of an accelerator is often difficult because of lack of comparable data. The common designation of accelerators as slow, rapid and ultra-rapid lacks definiteness. Efforts have been made to classify them chemically and two excellent papers on the subject have been published, one in English[3] and one in French[4].

The classification made by Dinsmore and Vogt is as follows:

1. Dithio carbamates — represented by such accelerators as Vulcacit P., Superac and Grasselerator 552. This also includes the metallic salt of dithiocarbamic acid such as the Supersulphurs Nos. 1 and 2.
2. Xanthates—zinc salts of ethyl, propyl and butyl xanthic acid.
3. Thiurams—these include tetra methyl thiuram mono and di-sulphides.
4. Mercaptobenzothiazoles—including metallic and amine salts.
5. Vulcanol—not a class.
6. Faster aldehyde amine derivatives—such as A-16 and A-20, B.B., Grasselerators 808 and 833, Heptene.
7. P—nitrosodimethylaniline—not a class.
8. Ethylidene anilines, A-7, A-19, Crylene, R. & H.—40 and 50, Tensilac 39 and 41, Vulcanex, Vulcone.
9. Aldehyde ammonia—not a class.
10. Guanidines—such as diphenyl and di-o-tolyl, phenyl-o-tolyl and triphenyl guanidines, triphenyl and tri-o-tolyl, guanidines differ in speed and strength from properties listed in the table.
11. Hexamethylenetetramine—not a class.
12. Thio ureas—diphenyl, di-ortho-tolyl, and di-methyl-xylyl thio ureas.

The classification of accelerators by André Bloc is arranged thus:: A. Organic bases (1) Amine and derivatives, (2) condensation products of aldehydes with ammonia or an amine. B. Nitroso derivatives. C. Carbon derivatives of carbonic acid and carbon disulphide, (1) urea and its derivatives, (2) thiourea and its derivatives, (3) derivatives of dithio-carbonic acids, (4) other ultra-accelerators, (xanthates, etc.). D. Organic colors. E. Albuminoids. F. Other accelerators, such as anthraquinone, dithio-acids, derivatives of benzothiazol, glycerophosphate of potassium, etc.

The accelerators recorded in Tables 1 to 4 are all commercially available. They are classified chemically and listed by trade names. One can thus readily identify any accelerator and compare its technical characteristics and adaptability with any other. The data tabulated is from

[2] "Twenty-five Years of Rubber Chemistry," by William C. Geer. Presented before the Division of Industrial and Engineering Chemistry at the 69th meeting of the Amer. Chem. Soc., Baltimore, Md., April 6-10, 1925.

[3] "A Scheme of Acceleration Classification," by R. P. Dinsmore and W. W. Vogt of the Goodyear Tire & Rubber Co., Akron, O. Presented before the Institution of Rubber Industry, London, Mar. 13, 1928. *I. R. I. Transactions*, June, 1928, pp. 85-101.

[4] "Les Recherches Actuelles dans la Technique du Caoutchouc," by M. André Bloc. *Science et Industrie*, July, 1928, pp. 47-49.

original manufacturers and will serve as an aid in factory practice and a guide for the selection of substitute accelerators in cases of emergency.

Chemical Groups

The chemical grouping adopted here is as follows: Table 1. Aldehyde amines, including Schiff bases. Table 2. Salts of thio acids. Table 3. Thiurams, thiazoles, thioureas and miscellaneous organic salts. Table 4. Guanidines.

Simple amines are omitted as a class because aniline, the principal and typical one, is superseded in practice by the other classes. Because of their early importance the following reference is made to amines as a class, represented by aniline.

Simple Amines

An amine is a carbon compound derived from ammonia by substituting alkyl or hydrocarbon radicals for the hydrogen atoms. According as 1, 2 or 3 hydrogen atoms

Table 1—Aldehyde Amines

No.	Maker	Trade Name	Chemical Name	Specific Gravity	Physical State	Odor	Toxic Effect	Activity	Anti-aging Value	Tensile	Modulus or Stiffness	Curing Range Degrees F.	Remarks
1	R.S.L.	A-5-10	Formaldehyde aniline	111	Pasty	None	None	M	L	L	L	274 up	These accelerators are adapted for general work and molded goods where a darkening effect is not objectionable and good aging value is desired. It is well to add from ½ to 1½ per cent of stearic acid on the rubber as stabilizer. Use about 5 per cent of zinc oxide as activator.
2	R.S.L.	A-7	Acetaldehyde reaction product of ethyledene aniline.	110	Viscous liquid	Slight	None	H	H	M	M	274 up	
3	R.S.L.	A-11	Formaldehyde reaction product of a Schiff base	115	Resin	Slight	None	M	H	M	M	287 up	
4	R.S.L.	A-16	Aldehyde derivative of a Schiff base	100	Thin liquid	Aromatic	None	H	H	H	M	266-287	
5	R.S.L.	A-19	Same as A-11.	117	Resin	Slight	None	M	H	H	M	274 up	
6	R.S.L.	A-20	Aldehyde ammonia derivative.	90	Liquid	Distinctive	None	H	O	M	M	287 up	
7	R.S.L.	A-32	Aldehyde derivative of a Schiff base.	99	Liquid	Aromatic	None	H	M	H	H	287 up	
8	R.H.C.	Aldehyde ammonia	Aldehyde ammonia..	...	Powder	Ammonia	None	M	M	M	M	287 up	Used principally for friction and skim coatings. Needs no activator.
9	B.F.G.	B-B	Butyr aldehyde-para-amino-dimethyl aniline.	102	Oily liquid	Distinctive	None	M	H	M	M	274-307	Used mostly in hard rubber.
10	N.C.C.	Crylene, hard	Aldehyde amine....	112	Resin	None	None	M	H	H	M	274-338	Interchangeable except for amounts. Discolor white goods.
11	N.C.C.	Crylene paste	Aldehyde amine compounded with stearic acid.	101	Resin	None	None	M	H	H	M	274-338	
12	R.H.C.	E-A	Ethylidene aniline...	112	Thick syrup	Distinctive	None	H	H	H	M	287 up	For heels, soles and general goods except inner tubes. More active than D.P.G.
13	R.H.C.	F-A (high m.p)	Formaldehyde aniline	114	Powder	None	None	M	M	M	M	287 up	Mild auxiliary accelerators. They retard scorching of more rapid accelerators.
14	R.H.C.	F-A (low m.p.)	Methylene dianilide.	115	Powder	Aniline	None	M	M	M	M	287 up	
15	N.C.C.	Furfuramide	Furfural aldehyde..	94	Powder	Distinctive	Mild	M	H	H	H	274-307	Large rubber parts such as roll covers, bumpers, etc.
16	G.C.C.	Grasselerator-102	Hexamethylene tetramine.	102	Powder	None	Strong	M	M	H	H	293 up	Adaptable generally. Inactive at low temperatures.
17	G.C.C.	Grasselerator-808	Aldehyde amine....	94	Liquid	Slight	None	M	H	H	H	266-287	Wide range in curing time and heat. Activity increases with temperature. Low percentages of sulphur can be used. Suitable for carbon black and reclaim rubber stocks.
18	G.C.C.	Grasselerator-833	Aldehyde amine condensation product.	85	Liquid	Slight	None	M	H	H	H	Under 266	
19	N.C.C.	Heptene	Consists of 1 part heptene base and 4 parts mineral oil.	0.94	Liquid	None	None	M	H	H	H	274-307	Accelerates well with all materials except carbon black and distinctly acid materials. Easy to handle without scorching.
20	N.C.C.	Heptene base	Heptaldehyde aniline	...	Liquid	Slight	None	H	H	H	H	274-307	
21	R.H.C.	Hexa	Hexamethylene tetramine.	102	Powder	None	Strong	M	M	H	H	293 up	Adaptable generally. Easily worked, non-scorching.
22	du P.	Methylene aniline	Anhydro - formaldehydeaniline.	114	Powder	Slight	None	M	O	M	L	287-320	Have softening effect on rubber. May be used to retard scorching.
23	du P.	Methylene dianilide	Methylene - diphenyl - diamine.	115	Powder	Slight	Slight	M	L	M	L	287-320	
24	du P.	Methylene paratoluidine	Methylene paratoluidine.	111	Powder	Slight	None	L	L	M	L	287-320	
25	R.H.C.	Tensilac-40	Aldehyde amine....	115	None	None	None	H	H	M	L	287 up	Very active, non-scorching. Efficient in general compounding and with reclaims.
26	R.H.C.	Tensilac-50	Aldehyde amine.....	110	Powdered resin	Slight	None	M	H	M	M	287 up	Mixes readily in rubber. Gives moderate tensiles over large range of cures. Is safe for general use.
27	R.H.C.	Tensilac-39	Aldehyde amine.....	112	Powdered resin	Ammonia	None	M	H	H	H	287 up	A good tire tread accelerator.
28	R.H.C.	Tensilac-41	Aldehyde amine.....	115	Resin	None	None	H	H	H	H	287 up	Adapted for short rapid cures and good aging effect.
29	N.C.C.	Trimene	Triethyl-trimethylene triamine and stearic acid.	90	Paste	Ammonia	None	H	H	H	M	258-307	Universally applicable for molded goods. Interchangeable except for amount suitable for dry heat cures. Universal adaptability.
30	N.C.C.	Trimene base	Tri-ethyl trimethylene tri-amine.	89	Heavy liquid	Ammonia	None	H	L	H	M	258-307	
31	du P.	Vulcanex	Aldehyde amine.....	107	Resin	Very slight	None	M	L	M	M	266-320	Suitable for hard rubber.
32	du P.	Vulcone	Aldehyde amine....	109	Resin	Very slight	None	H	L	M	M	266-320	
33	du P.	Vulcanol	Aldehyde amine.....	106	Liquid	Very slight	None	H	H	H	H	250-298	Inactive below 230° F. Very suitable for higher cures. Protects physical properties from over-cure.
34	R.S.L.	Waxene	Dispersion of A-16 in wax.	102	Wax	Aromatic	None	H	H	M	M	266-287	Compare A-16.

B.F.G. = B. F. Goodrich Co.; du P. = E. I. du Pont de Nemours & Co.; G.C.C. = Grasselli Chemical Co.; N.C.C. = Naugatuck Chemical Co.; R.H.C. = Roessler & Hasslacher Chemical Co.; R.S.L.=Rubber Service Laboratories Co.
H, M, L = high, medium and low; O = none.

are replaced the resulting amines are called primary, secondary or tertiary. With exception of aniline the simple amines are now completely discontinued as accelerators, because they can not compete in activity, darken rubber and do not improve the physical properties as do other types of accelerators.

Aniline or aniline oil was the original and for years the principal accelerator used notwithstanding its violently poisonous quality. It is used now only in a limited way where special facilities are provided to eliminate its health hazard. Other simple amines are not rated as worthwhile accelerators being too mild, slow and suitable only for dark colored rubber goods. Beta-naphthylamine has some use as a softener and is rated by Healy as relatively non-poisonous.

The following regarding the poisonous nature of aniline is quoted from a paper on health hazards in the rubber industry.[5]

"Aniline is exceedingly toxic. It is a volatile poison, affecting the nervous system and acting destructively upon the red corpuscles. The poisoning may be absorbed through the skin by direct contact or from saturated clothing or inhalation of the vapor given off during mixing and calendering, and also by way of the digestive tract.

"The first symptom of aniline is pallor, which soon changes to a striking bluish color, especially in the lips. There is usually severe headache and general weakness, and if the exposure to the fumes continues, loss of consciousness, which may be prolonged alarmingly. It is not necessary that the exposure to aniline fumes be long continued or intense for serious symptoms to ensue.

"While comparatively few deaths from aniline poisoning have been reported in the rubber industry, there have been many serious and chronic cases. Where death has occurred, it has usually been through absorption of the poison through the skin, this occurring where the worker has had his clothes become saturated with the oil."

[5] "Compounding Materials Used in the Rubber Industry," by L. J. D. Healy. Published by National Safety Council, 108 East Ohio St., Chicago, Ill.

Aniline

Aniline is a primary amine containing one benzene radical. It is prepared by reducing nitro-benzene with hydrogen. As an accelerator of vulcanization its effect is mild but it has value as a softener in mixing and resists the aging tendency of cured rubber.

Aldehyde Amines

By far the larger proportion of rubber accelerators are aldehyde amines or aldehyde derivatives of Schiff bases. Acetaldehyde, formaldehyde, butyraldehyde and furfural aldehyde are the principal aldehydes used to form reaction products with aniline, toluidine, etc. These products include many popular accelerators of general utility and as a group offer a wide range in activity, anti-aging value, and tensile properties, at moderate cost. In physical form they include liquids, dry powders, resins and wax. In general they possess slight but not disagreeable odors some of which are distinctive and more or less persistent in cured goods. Their activity is from medium to high. In curing range they offer a selection as follows: in degrees F., medium, 266 to 287; medium to high, 274 to 320; low to high, 266 to 320.

Hexamethylenetetramine, or hexa, was one of the most popular aldehyde amine accelerators ten years ago but unfortunately it is toxic to a degree that limits its availability. The effect of hexa on the physical properties of cured rubber was stated by one investigator[6] as follows:

[6] "Vulcanization Tests on Hexamethyline tetramine," by C. S. Williams, INDIA RUBBER WORLD, April, 1922, p. 490.

Table 2—Salts of Thio Acids

No.	Maker	Trade Name	Chemical Name	Specific Gravity	Physical State	Odor	Toxic Effect	Activity	Anti-aging Value	Tensile	Modulus or Stiffness	Curing Range Degrees F.	Remarks
1	A.C.C.	Aero-X	Aniline - di - isopropyl-dithio-phosphate.	122	Powder	Pungent	None	H	M	H	H	258-274	Effective at 20 to 30 pounds of steam. Not preferred with acid softeners.
2	G.C.C.	Grasselerator-552	Piperidine - piperidyl-dithio-carbamate.	...	Powder	None	None	H H	O	H	H	230	Too rapid for practical use. Above 266° F.
3	N.C.C.	Lithex	Lead dithio-benzoate.	250	Powder	None	None	H	M	M	M	293-320	Co-accelerator with litharge, proportion 1 lithex to 4 litharge.
4	R.H.C.	Pip Pip	Piperidine - piperidyl-dithio-carbamate.	...	Powder	None	None	H H	O	H	H	230	Suitable only for cements, quick repair stocks, etc. In a zinc stock will cure rubber in 2 days at room temperature or in 3-10 minutes at 240° F.
5	R.S.L.	R-2	Carbon bisulphide product of methylene-dipiperidine.	100	Liquid	None	None	H H	O	H	H	72-200	Suitable for cures from room temperature to that of boiling water as in self curing cements, etc.
6	N.C.C.	Safex	Dinitro-phenyl ester of dimethyl - dithio-carbamic acid.	157	Powder	None	None	H	M	H	M to H	240-293	Safe and fast at 20 pounds of steam or above. Adapted to mold, open steam or air curing. Zinc oxide essential with Safex.
7	R.T.V.	Super Sulphur No. 1	Same as Zimate, on clay base.	...	Powder	None	None	H	M	H	L to H	210	Active at low temperature. Will cure cements in boiling water. For use in miscellaneous specialties. Modulus low in pure gum and high in compounded stocks.
8	R.T.V.	Super Sulphur No. 2	Lead salt of di-methyl - di - thio-carbamic acid on clay base.	...	Powder	None	None	H	H	H	H	258-274	Litharge required as an activator. Excellent in litharge stocks.
9	N.C.C.	ZBX	Zinc-butyl - Xanthate.	156	Powder	Xanthate	None	H H	M	H	H	165-250	For tube splicing cement, curing in 3 minutes at 266° F.
10	R.T.V.	Zimate	Oxydized zinc salt of di-methyl-di-thio-carbamic acid.	...	Powder	None	None	H H	H	H	M	210	For tube splicing cements. Cure of 5 minutes at 312° F.

A.C.C. = American Cyanimid Co.; G.C.C. = Grasselli Chemical Co.; N.C.C. = Naugatuck Chemical Co.; R.H.C. = Roessler & Hasslacher Chemical Co.; R.T.V. = R. T. Vanderbilt Co.
H H = very high; H, M and L = high, medium and low. O = none.

"In general, one per cent of hexa is the most satisfactory quantity to use for stock containing three per cent or more of sulphur. Only fair stocks can be produced with less than three per cent of sulphur regardless of the quantity of hexa used."

The simple reaction products of acetaldehyde and aniline are classed as Schiff's bases so called from Hugo Schiff, a German chemist who long ago conducted extensive investigations in aldehydeamine reaction products. Schiff bases are thick viscous liquids of complex nature yielding aldehyde derivatives of great practical value as accelerators, such as the well-known brands A-7, A-11, A-19, R & H 50, Tensilac, etc.

Sulphur Bearing Accelerators

The accelerators grouped in Tables 2 and 3 are sulphur bearing organic substances. The largest of these groups are salts of thio (sulphur) acids. As a class they rate as rapid or ultra rapid in activity. Some of them have high value as anti-agers and all rate high in their effect on the physical properties of rubber. They are effective at low temperatures and generally require expert care in use.

Thiurams, Thiazoles, Thiureas

Some of the most popular ultra rapid accelerators are thiurams and thiazoles. All stand high in activity and effect in improving physical properties. Of the thioureas, thiocarbanilide or "thio" was very popular ten years ago but is now largely discarded chiefly because it readily scorches rubber on the mixing mills and also because of its inconsiderable value in improving physical properties. Its tendency to scorch can be reduced by the addition of a little aniline or other suitable softeners. Thio is only suitable for extremely long cures.

Guanidines

The guanidines were the first rapid accelerators introduced with high tensile effect. D. P. G. was the first in the list and quickly attained popularity in tires, inner tubes and hard rubber goods. It is favored for white rubber footwear, sheetings, heels, mechanical goods and sundries. Triphenyl guanidine, T. P. G., is much less active than D. P. G. It is used largely in tires and mold work. It should be used in about the proportion of two parts with five of sulphur to 100 of rubber.

Accelerator practice like many other features in rubber technology is subject to rapid development and resultant changes. One of the best statements of American accelerator practice, however, is that by the late Dr. L. E. Weber in his lecture before the Institution of Rubber Industry[7].

Zinc Oxide and Accelerators

Zinc oxide is essential, for the activation of nearly all accelerators. It serves this purpose only in the presence of resins unless in soluble form. For this reason it is well to

[7] "American Accelerator Practice," by L. E. Weber. Read at the meeting of the Institution of Rubber Industry, May 12, 1922.

Table 3—Thiurams—Thiazoles—Thioureas—Miscellaneous Organic Salts

No.	Maker	Trade Name	Chemical Name	Specific Gravity	Physical State	Odor	Toxic Effect	Activity	Anti-aging Value	Tensile	Modulus or Stiffness	Curing Range Degrees F.	Remarks
						THIURAMS							
1	N.C.C.	Monex	Tetra-methyl-thiuram monosulphide.	140	Powder	None	None	H H	H	H	H	250-298	Good for air cures at 230-250° F. and in steam or mold from 20-30 pounds. Dipped goods may be cured in boiling water. Good booster for slow accelerators.
2	du P.	Thionex	Tetra-methyl-thiuram monosulphide.	140	Powder	None	None	H H	H	H	H	250-298	
3	R.T.V.	Tuads	Tetra-methyl-thiuram disulphide.	...	Powder	None	None	H H	H	H	H	240-287	Popular ultra-accelerator. Addition of fatty acid recommended in mixings. Addition of a small amount of litharge will prevent scorching of stock.
						THIAZOLES							
1	R.T.V.	Captax	Mercapto - benzo - thiazole.	142	Powder	None	None	H	H	H	H	258-307	Small amount of zinc oxide required as activator. Addition of fatty acid recommended. General utility accelerator for tires, mechanicals, footwear, etc.
						THIOUREAS							
1	R.S.L. / R.H.C.	A-1 or Thio	Thiocarbanilide	130	Cryst. powder	None	Slight	H	L	L	L	258-307	Very popular before discovery of many faster and better accelerators. Finds limited use in shoes and mechanicals. Scorches easily.
2	du P.	D.O.T.T.	Di-ortho-tolyl-thiourea	125	Powder	None	Slight	L	O	L	L	287-320	Resembles thiocarbanilide in milling character and care is required to prevent scorching. It is distinctly more active than thio. Finds application in shoes and mechanicals.
						MISCELLANEOUS ORGANIC SALTS							
1	D.C.C.	W-29	D.P.G. organic salt of di benzyl-di-thio carbamic acid.	100	Powder	Aromatic	None	H H	O	H	H	212-281	For tube splicing cements. Cure of 5 minutes at 312° F.
2	D.C.C.	W-80	D.P.G. salt of mercapto-benzo-thiazole.	100	Powder	Aromatic	None	H	H	H	H	258-307	Zinc oxide required as activator. Addition of fatty acid recommended. General utility accelerator for tires, mechanicals, etc.
3	R.S.L.	Z-88	Basic reaction product of a mercaptan.	122	Wax	Distinctive	None	M	H	H	H	250-274	Works well with colors. Has wide application in white stocks.
4	R.H.C.	Thermlo F	Organic polysulphide	...	Powder	Sweetish	None	H	H	H	H	240 up	For modern short cure practice. For example, molded inner tubes cured 5 minutes at 287° F.

du P. = E. I. du Pont de Nemours Co.; D.C.C. = Dovan Chemical Co.; R.H.C. = Roessler & Hasslacher Chemical Co.; R.S.L. = Rubber Service Laboratories Co.; R.T.V. = R. T. Vanderbilt Co.
H H = very high; H, M, L = high, medium and low; O = None.

add stearic acid in accelerated mixings or a softener with fatty acid such as degras, palm oil, pine tar, oleic acid, etc.

In general 2 to 5 per cent of zinc oxide is required on 100 of rubber, the accelerator itself being used in the ratio of ¼ to 3 per cent according to its activity. The sulphur ratios vary from 1 to 5 per cent on the rubber.

Formerly two or more accelerators were f.equently used in the same rubber mixing. This was done to lessen liability to scorching in mixing or to enhance the physical properties of the product. The need for using more than one accelerator in the same rubber mixing has disappeared by the development of the large list now available which provides selections adapted to every compounding need.

Tests

In comparing the efficiency of accelerators progressively increasing amounts of two of the same type should be compared, as for example D.P.G. with D.O.T.G. and not D. P. G. with Captax. Any accelerator requires a definite curing time to reach its maximum efficiency. Doubling the amount of accelerator does not materially shorten the curing time although it may considerably increase the tensile properties of the product. To reduce the curing time one should select an accelerator that reaches its maximum value quickly with higher heat.

Much practical information concerning any accelerator may be gained by testing it in a parallel series of stocks, one to be pure gum and the other a 40 per cent carbon tire tread. Cures suggested for the pure gum stocks are open steam at 20 pounds and mold cure at 60 pounds steam. For the tread stock the same open steam cure and mold cure at 40 pounds steam. The ratios per 100 of rubber should be, accelerator 0.5 and 2; stearic acid 1 in both stocks; sulphur 2 and 6 in pure gum, 3 and 6 in tire tread. Graphs made from data obtained from physical tests of each series will make evident information of much value.

Study should also be made of the valuable data, formulas, graphs and practical suggestions available in the bulletins published by the laboratories of accelerator manufacturers.

Table 4—Guanidines

No.	Maker	Trade Name	Chemical Name	Specific Gravity	Physical State	Odor	Toxic Effect	Activity	Anti-aging Value	Tensile	Modulus or Stiffness	Curing Range Degrees F.	Remarks
1	See footnote	D.O.T.G.	Di-ortho tolyl guanidine.	1.10	Powder	None	None	H	O	H	H	281-320	Applicable to every class of rubber compounds and in conjunction with all compounding ingredients. Very active in presence of reclaimed rubber. Do not dull or destroy organic colors. Non-scorching at milling temperatures.
2		D.P.G.	Di-phenyl guanidine.	1.13	Powder	None	None	H	O	H	H	281-320	
3		T.P.G.	Tri-phenyl guanidine	1.10	Powder	None	None	M	O	H	H	287-320	
4		P.O.T.G.	Phenyl ortho tolyl guanidine.	1.10	Powder		None	H	L	H	H	281-325	

These four accelerators are all made by the following companies: American Cyanimid Co., Dovan Chemical Co., E. I. du Pont de Nemours Co., Roessler & Hasslacher Chemical Co., Rubber Service Laboratories Co.
H, M, L = high, medium, low; O = none.

Table 5 —Recommended Accelerator Applications

This table indicates individual accelerators recommended for the principal lines of rubber goods. The numbered accelerators are listed in Tables 1 to 4, inclusive.

Rubber Goods	Aldehyde Amines (See Table 1)	Salts of Thio Acids (See Table 2)	Thiurams (See Table 3)	Thiazoles (See Table 3)	Thioureas (See Table 3)	Guanidines (See Table 4)	Miscellaneous Organic Salts (See Table 3)
Belting	3, 4, 5, 10, 11, 12, 14, 17 21, 25, 26, 28, 31, 33	6, 8	1	1	1, 2	1, 2	2, 3
Cements, Ordinary Hot Curing	All varieties	All varieties	All varieties	All varieties	All varieties	All varieties	All varieties
Self Curing	......	2, 4, 5, 7, 9, 10	......	......	......	......	......
Clothing, Bright Colors	......	......	1, 2	1	......	......	......
Dark Colors	12, 18*, 25, 26, 28, 30	......	1, 2, 3	1	......	1, 2, 33	2, 3, 4
Druggists' Sundries, Molded	6, 12, 16, 17, 18, 20, 21, 25, 26, 28, 30	1	1, 2, 3	1	......	1, 2	2, 3
Fabrics, Rubberized	8, 12, 18, 25, 30	7	1, 3	1	......	1	2, 3
Footwear, Rubber	1, 4, 16, 17, 18, 34	1, 8	1, 2, 3	1	1, 2	1, 2	2, 3, 4
Canvas with Rubber Soles and Trim	......	......	1, 2, 3	1	......	......	......
Hard Rubber	9, 10, 11, 19, 27, 32	......	......	......	......	1, 3	......
Heels	4, 10, 11, 12, 17, 25, 26, 28	1, 6, 8	1, 2, 3	1	......	1, 2	2
Hose for all purposes	3, 4, 5, 10, 11, 12, 17, 21, 25, 26, 28, 31, 33	6	......	1	......	1, 2, 3	2, 3
Insulated Wire	3, 4, 5, 17, 18, 19, 25, 26, 30	6, 8	2, 3	1	......	1, 2	2, 3
Jar Rings	3, 4, 5, 12, 17, 25, 26, 28, 29, 30	......	......	1	......	1, 2	2, 3
Matting and General Molded Articles	3, 4, 5, 10, 11, 16, 17, 25, 31	1, 6, 8	1, 2, 3	1	1, 2	1, 2, 3	2, 3
Packing, Roll Sheet	3, 4, 5, 12, 13, 14, 15, 17, 25, 26, 28, 31, 33	6	......	1	1, 2	1, 2	2
Pure Gum Articles, Molded	4, 17, 18, 20, 25, 33	1	1, 2, 3	1	......	1, 2	2, 4
Steam Cured	3, 4, 5, 8, 10, 11, 12, 17, 18, 20, 25, 26, 28, 30, 31, 32, 33	......	1, 2, 3	1	......	1, 2	2
Rolls, Covered	15, 29	......	......	......	......	......	......
Soles, Crepe	30	2, 4	1, 2, 3	1	......	1	2, 3, 4
Molded	3, 10, 11, 12, 17, 25, 26, 28, 31	1, 6	1, 2, 3	1	......	1, 2, 8	2
Sponge Rubber	6, 30	......	......	......	......	......	2
Stamp Gum	3, 4, 5, 18, 25, 26, 28	......	......	1	......	1, 2	3
Thread	3, 4, 5, 8, 15, 17, 19, 28, 33	......	1, 2, 3	1	......	1, 2	2
Tires, Outside	1, 3, 4, 5, 16, 17, 18, 21, 25, 30, 31	1, 6	1, 2, 3	1	......	1, 2, 3	2, 3
Inside	3, 4, 5, 12, 16, 17, 18, 19, 25, 26, 28	1, 6	1, 2, 3	1	......	......	2, 3
Solid	3, 4, 5, 16, 17, 24, 25, 26, 28	......	......	1	......	1, 2	2

*For the Peachey process of curing.

Rubber Division, A. C. S.

New York Group Meeting

THE New York group of rubber chemists held the second in its series of fall and winter dinner meetings at the Town Hall Club, 125 West Forty-third St., New York, N. Y., on Wednesday evening, Nov. 14. The attendance numbered 133.

Dr. Willis A. Gibbons, chairman, presided and read a communication from the directors of the Rubber Association of America announcing their decision to continue the financial aid in support of "*Chemical Abstracts*." This contribution is made at the rate of $3,000 per year for five years. Previous to the introduction of the speakers of the evening the following were elected officers of the local group for 1928-9: William B. Wiegand, of Binney & Smith Co., chairman, and W. H. Cope, of R. T. Vanderbilt Co., secretary and treasurer.

The guests of the evening were Dr. Philip Schidrowitz, London, England, and Herbert Rogers, managing director of the Northern Rubber Co., Nottingham, England. The suggestion to found the British Institution of the Rubber Industry is credited to Mr. Rogers who in his remarks sketched briefly the plan, organization and activities of the Institution.

Rubber as a substitute for leather was the topic of the talk given by the principal guest of the evening, Dr. Philip Schidrowitz, who has added another to his many notable contributions to the technology of rubber by producing rubber leather. This material solves, in large part, the economic problem of world shortage of leather. The lecturer illustrated his talk with many samples of American and English manufacture showing what is being done in new adaptations of rubber to purposes hitherto served by leather.

The familiar leather grain effects commonly seen in imitation leather are secured by embossing calendered coating of rubber upon a fabric base. These are frequently made in black or colors and familiar in rainproof clothing, upholstery and auto topping. Such applications are not, strictly speaking, substitutes for leather but merely rubber weatherproofed fabrics embossed to imitate grained leather.

Dr. Schidrowitz defined real substitutes for leather as those products that can be handled like leather in the manufacture of boots and shoes and their repair by cobblers both for uppers or tap stock (soling). Also in other lines for which leather is in demand, as in luggage, auto topping, etc.

The speaker made special reference to his solution of the problem of producing actual rubber leather in tap soling. This was accomplished by applying improved compounding developed along lines followed by various rubber technologists of whom the speaker named W. B. Wiegand, inventor of the all-rubber boot made without fabric construction.

The production of highly compounded tap stock with pliability and working qualities like leather represents a great advance in the art of rubber compounding. Carbon black makes the best tap stock but is not easily compounded. The surest criterion of its value are its tensile properties which should show 150 per cent elongation at 1,400 pounds breaking strength per square inch.

The advantages of rubber leather are: (1) it has the feel of leather and can be handled like it in the manufacture of goods; (2) it is far more durable in service than real leather; (3) for the pedestrian it affords greater security against slipping than leather on wet and greasy surfaces; (4) it is cheaper than good grades of leather.

The disadvantages as tap stock are few: (1) it is non-porous; (2) it will mark white or polished floors unless properly made; (3) in England it costs more than good sole leather. In regard to the first of these drawbacks, discomfort to the wearer is entirely obviated by the special construction of inner sole employed by means of which flexing the shoe in walking serves to ventilate it and prevent the collection of moisture due to perspiration. The tendency to mark polished floors is obviated by improved compounding and processing.

The successful production of rubber leather tap soling and stock for uppers requires the stock to have a leather-like feel, also that the product be pliable, non-blooming, non-splitable and non-crackable. It must also resist aging. Tap stock is made that resists without deterioration, for months on end, exposure to sunlight and climatic conditions of either tropic or temperate zones.

The lecturer showed a light weight black oxford built entirely of rubber leather which exhibited the material most acceptably, and he stated that equally successful results are attained in every adaptation to other uses and that it can be compounded from plantation rubber or vulcanized latex.

Boston Group Meeting

THE second meeting of the Boston group of the Rubber Division, A. C. S. was held Nov. 7, 1928, at the Boston City Club, 14 Somerset St., Boston, Mass. There were 250 members and guests present.

An informal dinner was served at 6:30 p. m. followed by an interesting talk on vulcanized latex by Dr. Philip Schidrowitz, the well-known rubber chemist of London, Eng., and inventor of the vultex process[1].

A few years ago it was discovered by Dr. Schidrowitz that crude rubber in latex can be converted into vulcanized rubber *without coagulation taking place*. Vulcanized latex, like raw latex, is a mobile, non-viscous fluid in which the rubber particles are in Brownian movement. There has been some alteration in the shape and appearance of the particles as seen under the microscope and the movement has intensified somewhat but externally vulcanized latex is not distinguishable from raw latex.

The fundamental difference between them may best be understood if it is pointed out that when raw latex is evaporated a film of crude rubber results, while if vulcanized latex is evaporated, a film of vulcanized rubber is obtained. In this fact lies the germ of great commercial possibilities.

After preliminary trials to obtain suitable conditions to prevent coagulation, for example, the degree of alkalinity, or absence of acidity, dilution, duration and degree of heating, etc., it was found possible to obtain hot cured uncoagulated latex showing Brownian movement by treatment with polysulphides, which on evaporation, coagulation or precipitation yielded vulcanized rubber. When "flowers," precipitated or "colloidal" sulphur was substituted for the polysulphides under appropriately adjusted conditions, well cured, uncoagulated latex was obtained with all these varieties of sulphur. By selecting suitable conditions, well cured rubbers containing up to three per cent of combined sulphur were obtained.

With vulcanized latex have come many new uses and applications of rubber. A number of these were interestingly illustrated by samples, shown by the lecturer, of rubber goods manufactured from vulcanized latex.

Chairman C. R. Boggs closed the meeting with complimentary remarks on the favorable progress made by the Boston group. Officers for the coming year are: Chairman, John M. Bierer, Boston Woven Hose & Rubber Co., Cambridge, Mass.; secretary-treasurer, Thomas M. Knowland, Hood Rubber Co., Watertown, Mass.

[1] "The Vultex Process," by Philip Schidrowitz, INDIA RUBBER WORLD, Dec. 1, 1925, pp. 140-1.

Restriction in Retrospect

The Outstanding Result of Restriction has been to Increase the Total Area Planted to Rubber in the Middle East by about 1,600,000 acres or 36 per cent during the 1923-1927 period

E. G. HOLT

Chief Rubber Division, Department of Commerce

FUTURE attempts at government regulation of rubber production seem most unlikely. United action by all producers without government direction appears incapable of realization in the near future and although the issue is being kept alive among European companies, the possibilities of success in any such venture do not look promising. Even if some form of voluntary cooperative control should be devised, such inattention to consumer needs as characterized government restriction need not be feared; no group of business men would arbitrarily disregard their customers, nor raise prices to a point which would unduly hamper consumption or stimulate competitive production. Restriction has clearly demonstrated these results of abnormally high prices. Its result will doubtless have its effect on similar schemes designed to regulate production of other commodities. As usually is the case with government relief to industry, any need there may have been for rubber restriction was practically ended by the time it was made effective; instead of acting as a stabilizing market factor, government restriction aggravated trade conditions; exportable allowances were usually high when stocks were increasing and low when stocks were being reduced.

The outstanding net result of price maintenance through restriction has been to increase the total area planted to rubber in the Middle East by about 1,600,000 acres or 36 per cent during the 1923-1927 period. The increase was not uniform throughout all planted areas; in British Colonies the acreage under rubber increased by only 17 per cent as compared with over 70 per cent elsewhere in the Middle East. Most of the increase, as will be seen in the accompanying table of estimated acreage, was in the Dutch East Indies and very largely in native rubber areas. It should be stated that the acreage statistics for 1927 are official only for Ceylon and Dutch estates; other 1927 statistics are personal estimates, believed to be conservative, particularly for Dutch native rubber. The estimates are based upon a careful study of all available published data of acreage planted, together with a consideration of production statistics for certain countries. Perhaps the principal reason leading to abandonment of restriction was a growing realization of the effect price maintenance was having on the planting of rubber, as shown by official acreage statistics for Dutch estates and for Ceylon, and as indicated by the constantly increasing annual production of Dutch native rubber and the reports of the Dutch committee which investigated conditions in native rubber centers.

Estimated Acreage Under Rubber in Middle East

	1922 Acres	1927 Acres
British Colonies		
Malaya	2,268,000	2,632,000
Ceylon	443,000	499,000
India and Burma	126,000	147,000
North Borneo	59,000	93,000
Sarawak, etc	81,000	113,000
Total	2,977,000	3,484,000
Other Middle East		
Dutch Estates	940,000	1,199,000
Dutch Natives	500,000	1,300,000
Indo-China	83,000	137,000
Siam	30,000	43,000
Total	1,553,000	2,679,000
Grand Total	4,530,000	6,163,000

Whereas British Colonies had within their boundaries 65.7 per cent of the total acreage planted to rubber in the Middle East at the end of 1922, the British share had dwindled to 56.6 per cent of the total at the end of 1927.

The table published herewith indicates that, whereas British Colonies had within their boundaries 65.7 per cent of the total acreage planted to rubber in the Middle East at the end of 1922, the British share had dwindled to 56.5 per cent of the total at the end of 1927, and this on the basis of estimates that are more conservative for non-British than British areas, besides disregarding planting in Liberia and the Philippines. Some authorities believe that the acreage planted to rubber by Dutch natives is today nearly 2,000,000 acres. The extent to which native rubber areas will produce is generally recognized as debatable, as with wild rubber production, depending on the price of rubber and the availability of labor.

The following brief review of restriction includes a few items of general interest particularly to Americans which have not previously been emphasized in published accounts.

It was the excessive profits of the rubber plantation industry during the 1910-1913 period that caused such extensive planting as to lead to over-production in the period following the war. Fears of possible over-production were entertained by some planters as early as 1917, but the event was delayed by the post-war boom and might never have come about except for the 1920-1921 world slump in trade, accompanied as it was by the introduction of cord tires in place of less durable fabric tires.

Not all planters were of one mind with regard to the desirability of governmental regulation. It was only after the failure of the attempt at voluntary restriction in 1921, ren-

dered abortive by the reduced demand for rubber that year, that planters in the British Colonies became generally convinced of the necessity of action by their government to control rubber output. Some influence in solidifying and unifying the industry in this direction has been credited to the *Straits Times* (British Malaya) and its constant editorial support to the policy of restriction. When Dutch producers declined to participate in the scheme as proposed in June, 1922, it was concluded rather generally in America that independent action by the British Government was unlikely, and the receipt of news of the decision, made October, 1922, to attempt crop regulation through control over exports from Malaya and Ceylon with voluntary support from English-owned plantations in Netherland East Indies, was a distinct surprise to most Americans, although foreknowledge may have been the part of a few individuals.

Just prior to the making of this decision, certain Americans were in London trying to interest rubber plantation companies in a gigantic amalgamation scheme, aided by American capital, and the British press has more than once implied that restriction was adopted under stress of fear that the rubber producing industry might slip into American hands through this proposed amalgamation or through purchase by American interests of bankrupt estates. While this is too unlikely for full acceptance, it is probable that the incident had some influence, coinciding as it did with a time of serious depression in the producing industry.

When restriction became effective November 1, 1922, American manufacturers were united only in believing that arbitrary regulation of the market would be too inflexible to promise stability. Continued buying pushed the market up, from around 15 cents to above 35 cents, within three months. An official delegation of British producers which came to America early in 1923 reassured most of the rubber manufacturers, creating the belief that in case an emergency arose by reason of the operation of restriction action would be taken to prevent unreasonable prices of rubber. A large group of manufacturers were convinced that the demand for rubber would constantly increase for many years, that more rubber must be planted or there would result a serious long-continued shortage, that in order to encourage more planting prices must be high enough to assure attractive profits to producers, and that a scheme intended to stabilize the price of rubber at such a level as to produce these results was worth a trial. A smaller group of manufacturers was unalterably opposed to the scheme.

The attitude of the American Government was influenced by international and economic consideration beyond the pale of the rubber industry itself. Restriction of rubber exports was merely one of several schemes intended to benefit foreign producers at the ultimate expense of American consumers of commodities not produced in America. Such schemes, often sanctioned by the legislative action of foreign governments, had already occurred more or less frequently during the post-war period. They were regarded not only as economically unsound, but as dangerous to international goodwill. The implied British sanction of such schemes by the adoption of restriction was a matter of more serious concern than previous action along similar lines by less important nations. The possibility of international trade becoming the subject of international bargaining among politicians was opposed to the American policy. Hence such remedial steps as were possible were taken to meet the situation.

During the spring of 1923, the price of rubber began a gradual decline which lasted well into the summer of 1924; this had the effect of lulling manufacturers into a sense of security. Consumption of rubber in America and elsewhere was increasing, but not with great rapidity, and world stocks of rubber during this period were steadily being reduced, especially after standard production was reassessed on a lower basis for the second year of restriction beginning November, 1923. Mounting exports of Dutch native rubber during 1923 and 1924 was a factor which, coupled with the lack of uneasiness among buyers, tended to depress the price of rubber, and it was only when alarm began to be felt as to the adequacy of supplies for 1925 that prices began to appreciate. Buyers in America had during the preceding two years come to neglect the influence of restriction and the scheme was not generally well understood in the United States.

Meanwhile the Government was prosecuting its half-million dollar survey of rubber production possibilities throughout the world, and the wild rubber and guayule rubber industries had begun to display a renewal of activity. Guayule rubber furnished 15,614 tons in the years 1923-1927 against only 2,987 tons for the preceding five years, besides laying the foundation for future possible development.

At the end of 1924 it became apparent that increased exports of rubber from the restriction area would be necessary to maintain supplies for 1925. Increased exports could only come, under the restriction scheme, as a result of higher prices, but many manufacturers believed some sort of special concession would be made to prevent a runaway market. American manufacturers were and are highly competitive and each individual buyer naturally tries to buy advantageously; with individual action, therefore, the tendency was all against increasing the price of rubber above an economic level. During the November, 1924-January, 1925 restriction quarter the price was averaging just below the level of 1 shilling 6 pence. An average London market price above that figure for the quarter would have resulted in a 10 per cent increase in the exportable allowance for the succeeding quarter, and as the quarter neared its end during late January, at least one American manufacturer who really understood the situation placed purchase orders in London at the price necessary to raise the average for the quarter above the 1 shilling, 6 pence level. The orders, however, failed to specify that the rubber be purchased in the open market. The price specified was above the ruling market level, and the London parties naturally transferred the orders to their books and shipped the rubber, making a nice profit, and as the transaction did not affect the London open market price, the average price fell below 1 shilling, 6 pence by 0.0017 pence.

Had the purchases been made in the open market it is calculated that supplies of rubber during the ensuing year might have been greater than they were by about 1,500 tons monthly or 18,000 tons for the year, and that quantity of rubber would have certainly gone far to hold in check the wild speculation and high prices which characterized 1925. It is specifically stated that London parties to the above transaction acted in absolute good faith with no thought of influencing the exportable allowance, and the incident is mentioned merely as an example of the lack of knowledge in America about the operation of restriction.

The temporary shortage of 1925 was contributed to by speculative trading in crude rubber in all the leading world markets and by speculative purchases of tires by dealers and motorists. Knowing that tire price increases were bound to follow the rising price for crude rubber every incentive was given for advance tire purchase to forestall these price increases. The general changeover from high pressure to low pressure tires during 1925 was of itself responsible for a greatly increased consumption of rubber, and accentuated the crisis.

The high prices which followed centered public attention on the rubber situation, and a Congressional investigation was undertaken to clarify the situation which had forced American manufacturers to make five successive increases in tire prices during a single year. At the hearings before

the House Committee on Interstate and Foreign Commerce early in 1926, the wide range of monopoly controls by foreign governments was emphasized and remedial measures discussed. Among other remedies proposed for the rubber situation were the development of plantations in countries outside the restriction area, increased use of reclaimed rubber and rubber substitutes, centralized buying of rubber by manufacturers, conservation of rubber by motorists and other final consumers, stimulation of the wild rubber industry, and organized research for synthetic rubber. While all of these activities were carried on, use of reclaimed rubber and centralized buying of crude rubber by manufacturers proved most effective.

The use of reclaimed rubber was naturally stimulated by the high price of crude rubber. While there are varying grades of reclaim, the bulk of the product is prepared from discarded automobile tires and inner tubes. Compared with other rubber products very little reclaimed rubber is used in the manufacture of inner tubes, and relatively little in casings. Rubber products which contain a large percentage of reclaimed rubber include hose and packing, heels, hard rubber goods, insulated wires, and mechanical rubber goods and footwear of all kinds; these products, except boots and shoes, are much less used than tires as raw material for further reclaiming. Consequently there is a continuous source of raw material for the reclaiming industry. To show how the use of reclaimed rubber increased it is sufficient to give the consumption of reclaimed rubber from 1924 to 1927.

ESTIMATED RELATIVE CONSUMPTION OF CRUDE AND RECLAIMED RUBBER

	Crude Long Tons	Reclaimed Long Tons	Ratio Reclaim to Crude Per Cent
1924	336,600	78,500	23.3
1925	387,600	137,000	35.3
1926	366,000	164,500	45.0
1927	365,000	172,000	47.0

Conservation by motorists played a considerable part in reducing the American consumption of rubber in 1926 and doubtless continued its influence thereafter. It is difficult to measure its extent accurately. Certainly tires and particularly inner tubes were less frequently discarded when capable of repair during 1925-1927 than in former years. Many tire dealers did a thriving business in vulcanizing and selling rebuilt tires during these years. Production and sale of tire repair materials also showed a rapid increase, and equipment for vulcanizing tires was installed by an increasing percentage of tire dealers.

The first suggestion that pooled purchasing of rubber by manufacturers would reduce the risk of all members of the industry was made in 1923, when a delegation of rubber manufacturers was visiting Washington. Such a program called for a unanimity of purpose in the industry that was non-existent at that time. The experience of 1925-1926 destroyed any American confidence in restriction and drew public attention to its dangers; from then on all manufacturers were opposed to the effects resulting from restriction. Late in July, 1926, it is understood that American manufacturers acted in unison in supporting the price of rubber at the level necessary to maintain the 100 per cent exportable allowance then in force under the restriction regulations, and it is calculated that their action, which delayed the 20 per cent reduction in exports for three months, and similarly delayed subsequent reductions, resulted in the exportation of fully 40,000 tons more rubber during the ensuing twelve months than would have been exported otherwise. This cooperative action was confirmed by the press in November, 1926, and the pool is generally credited as the principal factor in maintaining relative market stability from July, 1926 to January, 1928.

Manufacturing developments also tended to reduce the consumption of rubber. Chemists had so improved reclaimed rubber that it could be used in the manufacture of quality rubber products, and compounding knowledge had generally increased. The balloon tires, after 1925, proved to have unexpected durability quite equal to high pressure casings, and equally important from a rubber-saving viewpoint, inner tubes used in low pressure tires were seldom ruined by blowouts, and relative demand for inner tubes fell off sharply. For each casing produced in 1925, 1.32 inner tubes were manufactured; for 1927, the ratio was only 1.12 inner tubes to each casing, and this naturally means a great saving in rubber since each inner tube contains about 1.63 pounds of crude rubber.

Thus the developments in the rubber manufacturing industry tended to reduce the consumption of rubber. In the rubber producing industry the tendency from 1925 on was toward increased production. High prices brought an increased output of rubber from all areas not subject to restriction. The operation of the restriction scheme brought the exportable allowance to 95 per cent standard production on February 1, 1926, when a special concession of 5 per cent more was made by the British Government. Increased allowances were given to small producers in Malaya in August, 1925, and standard production assessments in Malaya and Ceylon were increased generally for the restriction year beginning November, 1925, and again a year later. Smuggling of rubber from Malaya developed as another result of the high prices; my personal estimate of the amount of rubber smuggled from Malaya places the total at less than 20,000 tons divided as follows: 1923, 500 tons; 1924, 1,000 tons; 1925 and early 1926, perhaps 8,000 tons; and 1927, perhaps 10,000 tons. Finally, by increasing the pivotal price of rubber under the restriction scheme from 1 shilling, 3 pence, (30 cents) to 1 shilling, 9 pence (42 cents) per pound early in 1926, the British Government ensured high profits to rubber producers not subject to restriction, and thus stimulated competitive production particularly in the Dutch East Indies. At the end of 1925, it was the general belief of rubber producers that they were in for a long period of prosperity, and any loss of good will among consumers was disregarded.

By the end of 1926, the effects of reduced consumption in America were beginning to appear. While the facts about increased consumption of reclaimed rubber were characterized as American propaganda by many producers there was a growing realization that something was wrong. The raising of the pivotal price made it appear that rubber consumers were to be forced to "pay through the nose" for their rubber, and the charge of profiteering, which was not easy to contradict, did not sit well with those British producers who felt it was unwise to antagonize their principal customers. Both in Malaya and Ceylon criticism of the pivotal price increase began to appear. At the same time the growth of production in non-restricted areas was assuming the proportions of a definite threat to British supremacy in rubber production.

Up to this time, anti-restrictionists among producers were seldom vocal; although some were opposed to the scheme from its inception on economic grounds, they had been willing to give it a trial. Overassesment of standard production in Ceylon for 1927 led to Malayan criticism of the lukewarm support Ceylon was giving to the restriction scheme, and brought the retort that the failure of Malayan authorities to curb smuggling was a far more serious defection, also that Malaya was equally guilty of overassessment. Planters in Ceylon were not so much dependent on rubber as in Malaya, and felt they should not be made to support a policy designed particularly to assist the sister colony. Furthermore, Ceylon interests apparently gave more consideration to facts about the use of reclaimed rubber and the growth of rubber production outside British Colonies. When

the British Government attempted at the end of 1926 to limit the use of export permits issued as a result of over-assessment, opposition in the Ceylon legislature was too pronounced to be overcome. In November, 1927, when it was decided that to make restriction effective, the Malayan standard production must be reduced, Malayan planters divided into two camps, and the anti-restrictionists became nearly as numerous as those favoring restriction. The lack of unanimous support from British producers was certainly one reason supporting the April, 1928, decision of the British Government to discontinue restriction. The scheme was tending to reduce British Colonies to a secondary place in world rubber production; recommendations for making the scheme effective called for drastic changes and further experiment when each change was causing renewed criticism; and the scheme was not in accord either with the proverbial British trade policy or the attitude of the British Government as expressed in the discussions at the Geneva Economic Conference in 1927.

As matters have developed since April, it appears that the end of restriction could not have come at a better time for the benefit of the rubber industry in general, not even excepting the beginning of 1925. Removal of restriction in 1925 would have prevented the great extensions to planted areas that have since been made. World stocks of rubber have been greatly reduced this year, much more than would have been the case with continued restriction. While the prospect of the next few months is that stocks will be augmented by heavy arrivals from the East, there is an undercurrent of confidence among rubber producers that the outlook is much more hopeful than appeared possible last April, and even ardent restrictionists have come to realize that continuance of the scheme was not in the best interests of British rubber producers.

Tires in Relation to Road Surfacings[1]

W. J. A. Butterfield

THE bicycle, followed by the motor car, having driven wheels, as distinct from the "free" wheels of hauled traffic, revolutionized the wearing conditions of road surfaces. Good foothold for draught animals had been the governing factor in surfacing for hauled vehicles, whereas good grip for the tire of a driven wheel was essential for the bicycle and motor car. The tires of the driving wheels of these vehicles act as grindstones on the road surface whenever any driving slip occurs, and the reaction of the tire, when power is applied through the axle of the wheel, imposes a tearing strain on the surface.

The Tire in Relation to Road Surfacings

Tires were ordinarily of rigid material such as iron until the rubber tire was fitted to bicycles. At first the rubber was solid, but early in 1890 Dunlop brought out his pneumatic tire, while others suggested as an alternative the broad hollow, but uninflated "cushion" tire. There was at first doubt as to the utility of both these types, but this was dispelled by the results of the 24-hours' road trial held on August 30, 1890, by the North Road Cycling Club. Of 43 competitors in this trial, not more than eight had pneumatic, or more than 10 cushion tires, yet the six greatest distances were achieved by riders using one or other of these two, and the riders of machines with narrow solid rubber tires were far outdistanced. After making due allowance for the personal equation, those who took part in that trial were convinced that the road vehicle tire of the future would be of the pneumatic type, with a broad uninflated rubber tire as the next best, though much inferior, alternative. The motor car, when it was introduced in Great Britain in 1896, forthwith adopted from the bicycle pneumatic and broad rubber tires. The tire material for which a road surface now has to afford a grip is therefore rubber, but as persons on foot and horseback, farm stock, and vehicles hauled by animals also traverse the roads, the surface must likewise give a good foothold to iron and leather shoes, hoofs, etc.

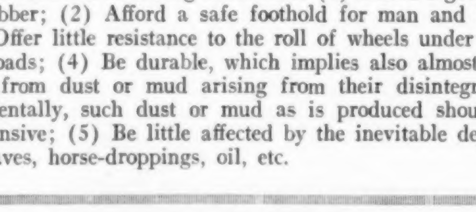
[1] From "Road Surfacing Materials," read at the London Section, Society of Chemical Industry and the Chemical Engineering Group, Oct. 1, 1928, *Chem. and Ind.*, Oct. 19, 1928, pp. 294T-309T.

Slipperiness

Rubber has a high coefficient of friction on polished or smooth surfaces in the absence of a lubricant. Provided the ice or snow is dry a bicycle may be ridden safely on ice or compacted snow, on which leather soles, hoofs, or iron treads slide forthwith, but as water is a good lubricant for rubber, a bicycle slips badly on wet ice or snow. Similarly rubber tires get a good grip on the smoothest and most polished of road surfaces when dry, as dry lubricants do not (unless in excess) cause rubber to slip. On the other hand, hoofs, shod or unshod, slip on very smooth polished surfaces, and if there is some impalpably fine dry powder to act as a dry lubricant the slipperiness of the surface to iron or leather is greatly intensified. So soon, however, as a smooth polished surface is lubricated by a thin film of water, or of wet dust, rubber tires slide upon it, and the driving wheels of bicycles and motor cars fail to obtain the grip necessary for the propulsion of the vehicle. Excess of water, causing dispersion of the wet dust, and lowering of the surface tension of the film, restores in large measure the grip of the rubber tire upon the smooth surface. The difference between dry and wet is less marked with iron and leather than with rubber, as in no case do they obtain a satisfactory grip of really smooth surfaces.

Desiderata in Road Surfaces

These and other considerations of the nature and action of present-day traffic on road surfaces indicate that these surfaces, whether they happen to be dry, damp, or wet, should fulfil the following conditions: (1) Afford a good grip to rubber; (2) Afford a safe foothold for man and beast; (3) Offer little resistance to the roll of wheels under varying loads; (4) Be durable, which implies also almost freedom from dust or mud arising from their disintegration. Incidentally, such dust or mud as is produced should be inoffensive; (5) Be little affected by the inevitable deposits of leaves, horse-droppings, oil, etc.



THE REEVES TRANSMISSION OPERATING THE CONVEYER OF A BIAS CUTTING MACHINE

Herringbone Gears

DURING the past five years continuous tooth herringbone gears have become prominent in the power transmission field, and our readers will be interested in a brief outline of the development of double helical gears culminating in the invention of the Sykes continuous tooth gear. Also a description of the methods of their production and application will be timely.

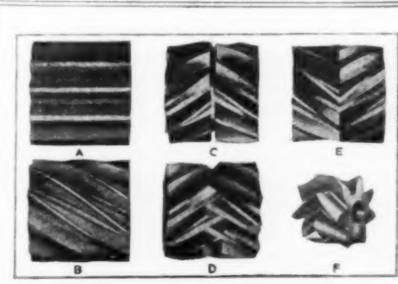
Herringbone gears have been used over one hundred years. At first they were made with the teeth cast from patterns, later with the teeth cast by molding machines, and finally with the teeth machine cut because of the greater accuracy required when running at higher speeds.

The invention of the steam turbine created a demand for herringbone gears designed and manufactured so that at high speeds they would run silently. Machinery was therefore developed for cutting the gears but the earliest types of gear cutting machines did not produce the graue of workmanship desired.

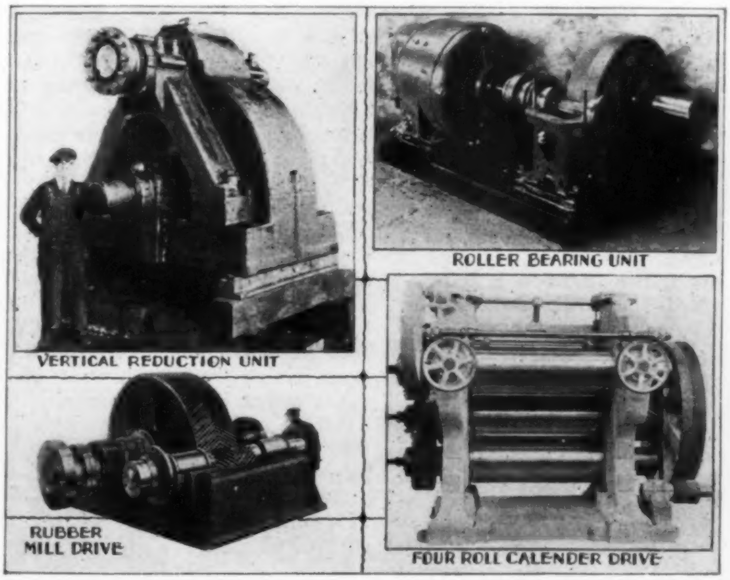
One of the first types of herringbone gears to be machine cut was developed by Citroen of Europe who made machines which cut herringbone gears by means of end mills. They were suitable for heavy mill work but unsuitable for high speed work. They had the additional disadvantage that they did not possess a tooth having load carrying capacity over the whole face width because the portion at the center was rounded and could not provide the proper tooth contour.

Subsequently Wuest succeeded in designing and building machines which cut herringbone gears out of the solid blanks by means of hobs and the system came into extensive use. These machines reduced the width of the gap between the right and left helices to an amount equal to the circular pitch which at that time was considered a minimum.

The group illustration presents each step in the development of gearing for parallel axes which has taken place since the seventeenth century. Straight tooth gears shown at *A*, when accurately cut in profile and tooth division, are satisfactory for low speeds, although the high cost of straight tooth gears cut with the necessary degree of accuracy generally makes double helical gears more economical. To offset the necessity for such accuracy the helical gear shown at *B* was introduced so that the load would be passed from tooth to tooth in a continuous manner and impact eliminated. It was soon found, however, that to obtain any real advantage the helical angle had to be between 20 and 45 degrees which nullified the advantage of the single helical gear due to the heavy thrust loads which were developed. For many years prior to the invention of machines for cutting straight tooth gears, cast tooth gears, when made of herringbone shape, had the right and left hand helices joined together in the center. Double helical gears with staggered teeth and with tool clearance in the center of the face width were introduced because at the time manufacturing limitations prevented them being made with continuous teeth. Of this type the "Wuest" was the most common and is pictured at *D*. With this gear there is a loss of bearing surface on the teeth approximately equal in amount to the circular pitch and an obvious loss of strength. The loss of bearing surface can be compensated for by the shaping method and by cutting a groove for tool clearance as shown in *C*, but the loss of strength can only be avoided by the continuous herringbone tooth, Sykes type.



Plain, Helical and Herringbone Sykes Gears



Rubber Mill Applications of Farrel-Sykes Gears

In 1910 W. E. Sykes suggested that it would be possible to cut full *V* teeth, having sharp apices, by means of a generating shaping process. His proposal was ridiculed by many but he designed a suitable machine in 1914 which proved that the apparently impossible had been achieved. The war retarded development work, with the result that it was not until 1922 that it was considered advisable to place the machines, and the gears produced by them, on the market.

Herringbone pinions cut on the Sykes gear generator may be seen at *E* and *F*. These illustrations show clearly the contour of the teeth and that the junction of the right and left hand helices is clean and sharp, thus providing a full bearing surface on the tooth for the whole length. In addition, it is obvious that the tooth is very strong.

The mechanical elements of the Sykes gear generator comprise cutters in the form of single helical pinions with the ends of the teeth ground to form cutting edges and the side of the teeth ground with the necessary cutting relief. The cutters reciprocate axially, each being secured to its own spindle. Connected with the cutter spindles are helical guides which engage with counter parts fixed within the sleeve of the cutter index wheels. These helical guides cause the teeth of the cutters to trace true helices when the cutters are reciprocated to and fro, in an axial direction. The cutter index wheels are connected by gearing to the main index wheel. Thus when the index wheels are rotated, the gear blank and the cutters are rotated in unison. The cutters represent a herringbone gear or pinion enmeshed with a herringbone gear or pinion represented by the work blank.

As the cutters reciprocate to and fro they have at the same time a twisting motion engendered by the helical guides. They also have a third motion which is imparted by the cutter index wheels, which motion is also in unison with the rotation of the work blank. Therefore, there is a generating motion known as the molding generating principle of action which is the basic principle of nearly every gear generating machine.

The Sykes machine is so arranged that each cutter at the end of the working stroke stops precisely at the center of the gear blank, or work face. In this way one cutter clears the way for the other one. The result is cleanly finished apices. It is the combination of the molding generating action and the position at which each cutter stops at the center of the wheel blank face that the apex of the tooth can be machined so perfectly.

In connection with the machines an efficient portable measuring and testing instrument is used. It consists of a dial indicator and a frame carrying a pair of adjustable jaws which have inclined faces representing the sides of a rack tooth. This instrument will detect errors to within .0005-inch in any size, type, or pressure angle of gears between 10 and 1¼ diametrical pitch. The surface which comes into contact with the gear teeth is such that no wear can occur. No calculations are necessary and no skill is required to use the instrument.

The improved type gears herein described find very important applications in the rubber industry where heavy power is generated and transmitted for the operation of mill lines and calenders. A few typical rubber mill applications of these gears are pictured in the illustration, including a roller bearing rubber mill drive of 600 h.p. built for operating mill lines reducing from 600 to 100 r.p.m.; a 42-inch vertical reduction unit for driving a line of rubber mills. This unit transmits 500 h.p. from 600 to 90 r.p.m. with Sykes gears having 22/146 teeth, 2 diametrical pitch, 20½ inch face; a 28 by 78-inch 4-roll rubber calender equipped with all Sykes' gear drive; and a typical roller bearing unit. The latter is one of a series built in sizes suitable for transmitting from 1 to 5,000 h.p.

Besides the rubber mill applications mentioned, herringbone gears are adapted for and find advantageous application to practically every type of gear driven rubber plant machinery.

Tire Exports vs. Domestic Sales

Tire exports for 1927 broke all records, according to the United States Census Bureau report, totaling 2,811,158 in the case of automobile casings out of a production of 63,-549,949; automobile tubes, 1,782,488 out of 70,855,455; automobile solids, 104,011 out of 812,548; other casings and tubes, value, $212,030 out of $3,559,482; other solid tires, $435,639 out of $1,637,721. Thus nearly 15 per cent of American-made solid and cushion tires found a foreign market.

Cure Not Vulcanization

THE term "cure," says Nicholas Bacon in the *Journal of Physical Chemistry,* is often used as a synonym of vulcanization, but it really designates a particular stage in the process of vulcanization that yields a product of commercial value. If a product has acquired the desired physical properties, it is said to be "properly cured." If it has not reached that stage, it is said to be "under-cured," and when it has been heated too long, it is said to be "over-cured."

During vulcanization some of the sulphur becomes firmly attached to the rubber, whereas the remainder can be easily extracted with suitable solvents. The sulphur held in firm combination is called "combined sulphur," and the percentage of combined sulphur present, based on the original amount of raw rubber, is called "coefficient of vulcanization." The amount of combined sulphur is not a measure of the degree of vulcanization.

Getting the physical properties characteristic of a properly-cured rubber mixture also depends to a great extent on the presence of foreign ingredients such as accelerators. With some organic accelerators it is possible to produce a vulcanized sample containing much less than half of one per cent of combined sulphur, and, too, some of its physical properties may be far superior to those of the sample which contained no accelerator and had a combined sulphur content of over three per cent. In properly evaluating the stages of vulcanization, due regard must be given the functions of accelerators, too; that is, whether their purpose is mainly to shorten the time of cure or to not only shorten it but to also enhance the physical properties of the vulcanizate.

Cutting Rubber Paving Costs

RUBBER paving blocks having a resilient cap affixed to a base made of sand and stone clippings having a binder of vulcanite may be produced for about $9.66 a square yard according to two Dutch experimenters, J. G. Fol and F. C. van Heurn, The Hague, Holland. They reckon on 18-cent plantation rubber and estimate costs of compounding materials from quotations in the INDIA RUBBER WORLD early in 1928. Conceding that block cost might be considerably reduced if lower grades of rubber be substituted, they advise, however, caution in making such substitution. They also say that experiment may justify the use of shallower blocks in many cases and believe that cost may also be cut through large scale manufacture.

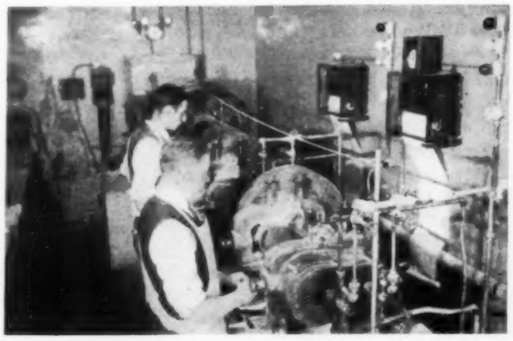
Such blocks have a length of 20 cm., a width of 10 cm., and a height of 8.5 cm. The base has a thickness of 7.1 cm., two intermediate layers, one of hard rubber joining the base and the other of semi-hard rubber joining the cap, 0.3 cm., and the soft rubber cap 1.1 cm.

For the vulcanite binder in the base the compound was: Rubber 1,500, talite 2,000, chalk 2,000, lime 2,500, asphalt 500, sulphur 1,500; total, 10,000. For the intermediate layer joining the base it was: Rubber 1,500, zinc oxide 4,000, carbon black 500, asphalt 500, sulphur 1,500; total, 8,000. For the intermediate layer joining the cap: Rubber 1,500, zinc oxide 4,000, carbon black 500, asphalt 500, sulphur 200; total, 6,700.

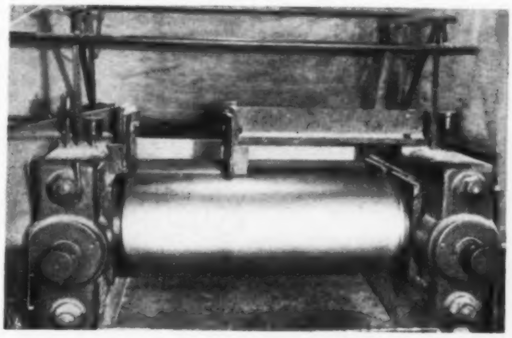
The mixture for the cap was: Rubber 1,500, magnesia 225, talite 225, zinc oxide 150, carbon black 600, chalk 300, stearic acid 75, asphalt 112.5, diphenyl guanidine 7.5; total, 3,307.5.

It is suggested that aging and abrasion resistance may be improved with anti-oxidants and selenium compounds in the cap compound.

Modern Rubber Research Laboratory



Laboratory Mills and Temperature Recorder

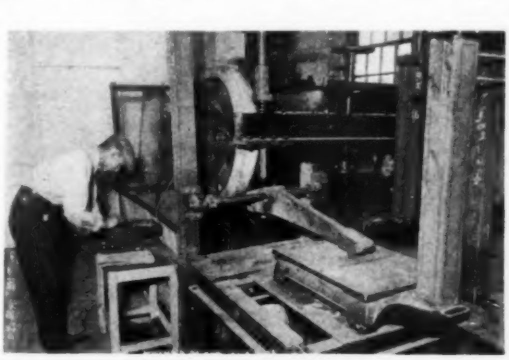


Mixing Mill with Stock Guide

THE Research Division of The New Jersey Zinc Co. operates a large well equipped rubber section devoted to research in rubber problems. The work includes investigation of experimental compounds by usual laboratory methods, and testing products into which these compounds have been incorporated. In addition, a large volume of routine rubber testing is done for grading zinc oxides and lithopones.

The milling equipment consists of two 6 by 12-inch experimental mills and one 16 by 42-inch mill. These have adjustable guides so that the working lengths of the rolls may be varied depending upon the size of the batch to be milled. All the mills are equipped with a device for the continuous recording of mill temperatures. This consists of a resistance thermometer mechanically held against the rubber on the mill roll, and connected to a recording Wheatstone Bridge. For the calendering of stocks on a small scale a 6 by 12-inch experimental 3-roll calender is used.

The curing equipment consists of three 24-inch single opening platen presses, a 24-inch double opening platen press, a dry heat vulcanizer, an open steam vulcanizer, a pot press heater equipped with hydraulic ram, and a sulphur chloride curing chamber with rotating drum. All of these devices have automatic temperature controlling and regulating equipment.



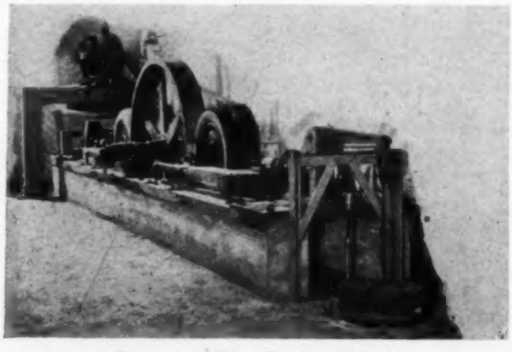
Solid Tire Testing Wheel

The three single opening platen presses are equipped with electric clocks which, after being set at the start of the curing period, automatically notify the operator that the curing time is up by flashing a light and ringing a bell. It is thus impossible to over or undertime compounds without the man in charge being aware of it.

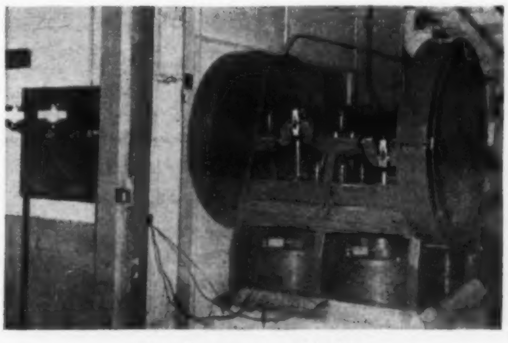
The testing equipment comprises three Scott tensile machines, one Olsen navy tensile tester, two New Jersey Zinc Co. abrasion machines, a Grasselli abrader, a U. S. Rubber Co. abrasion machine, a Scott flexing machine, two tire test wheels, the more rugged machine for solid tires and the lighter machine for pneumatics, and a compression machine for the testing of solid tire compounds.

The Scott tensile machines are all of the spark gap type requiring only one operator for the accurate determination of loads at specified elongations.

The solid tire test wheel has a maximum speed of 20 miles per hour and the tire on the wheel can be loaded by any weight up to 8,000 pounds. The pneumatic tire test wheel is arranged for testing two tires at once, at any speed up to 40



Pneumatic Tire Testing Wheel



The Compression Machine

miles per hour and at any load up to 5,000 pounds. It is also arranged that the tire can actually transmit power if this should be desired.

The compression machine is a device for testing solid tire compounds molded into cylindrical blocks cured to a hard rubber base. By means of this device the blocks can be pounded with any desired force between 1,000 and 2,500 pounds at a rate which corresponds to operating a solid tire at 20 miles per hour. The rise in temperature may be studied by means of thermo-junctions inserted into the interior of the cylinders by the Ashman awl method[1].

Instead of cutting dumb-bell test pieces by striking the die with a mallet, the dies are fitted into a foot-operated arbor press, thus insuring a good, clean cut at a single stroke.

Compounds are aged in a Geer oven and a large size Bierer-Davis oxygen bomb. Both are equipped with automatic temperature regulating devices, by means of which the temperature is held constant. As a final precautionary measure for assuring accuracy in testing, temperature and humidity are controlled. The entire room devoted to tensile tests is kept at 75 degrees F. within ±5 degrees variation. Cabinets which are kept at zero humidity are placed in this room and are of sufficient size for the storage of all master batches, all unvulcanized samples between milling and curing and all vulcanized samples between curing and testing. This insures uniformity of temperature and humidity for all stocks at all times.

[1] A. O. Ashman, "The Determination of Tire Temperatures," New Jersey Zinc Co., Research Bulletin No. 13.

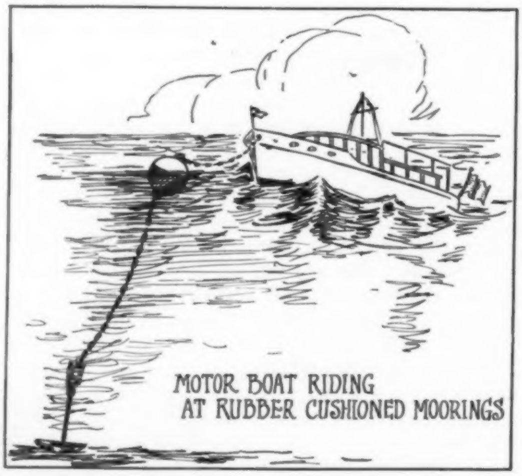
Rubber Cushioned Moorings[1]

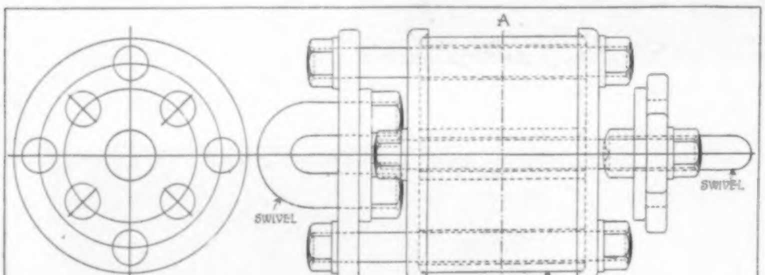
A New Application of Rubber as a Shock Absorber

THE safety of light built craft riding at moorings is more or less imperiled by reason of the unusual strain exerted upon the stem of the vessel in the event of heavy seas raised by violent wind. This danger is minimized by a recent application of rubber in the form of a shock absorber of special design. The construction employed is heavy and rugged in design as befits the nature of the service required.

The central feature of the device is the rubber insulator. This is a suitably compounded stock, molded in the form of a cylinder 7 inches in diameter by 5 inches long. It is perforated by a central bolt hole, 1½ inches in diameter, surrounded by 8 similar holes of 1-inch diameter which are spaced offset with respect to each other on two circles concentric with the central hole.

This rubber block is held between two steel countersunk steel plates which represent the general assembly of the device. Two swivel eyes, located one at each end of the central bolt take the pull of the mooring chain. The large side bolts are free to work without side wall friction on the rubber or compression plates. One end of this device is chained to the shank of the mooring which rests on the bottom while the eye at the opposite end is connected to the mooring chain, the other end of the latter being attached to the float on the surface which locates and identifies the mooring.





Swivel Rubber Cushioned Device for Moorings

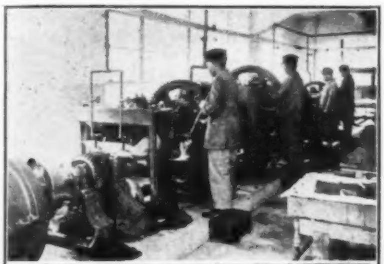
When the vessel is made fast at the mooring the strain on her bits and bow is greatly reduced and danger of parting the bow line virtually eliminated by reason of the absorption of the strain effected by the rubber located between the anchored end of the chain cable and the boat.

Briefly summarized this device and its application of rubber is a practical utility that will be appreciated in particular by yachtsmen because it provides: (1) means for cushioning the pull of the craft on her mooring; (2) the swivel is protected from being jammed by the mooring chain; (3) the weight it adds to the shank of the mooring helps to hold it in place; (4) there are no parts to wear out or replace; (5) it is not affected by chemicals in the water; (6) it requires no attention and is easy to install.

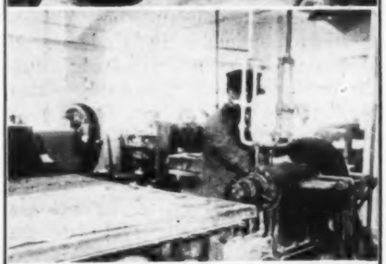
In effect this device embodies a new application of rubber as a shock absorber which will add to the safety of yachts and motor boats, at anchorages and the security of landing floats as well where these are necessarily located in exposed situations. This adaptation of rubber is in line with its use as a shock insulator in the spring shackles of motor trucks and for eliminating vibrations in power transmissions, engine suspensions, etc., that have become accepted practice in the automotive industry.

[1] Data furnished by International Motor Co., 25 Broadway, New York, N. Y.

Japanese Fountain Pen Factory

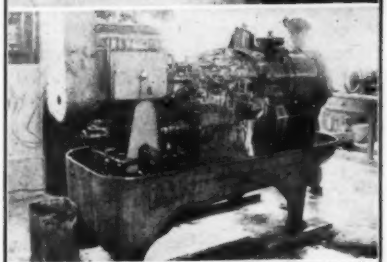


Rubber Mixing Mills

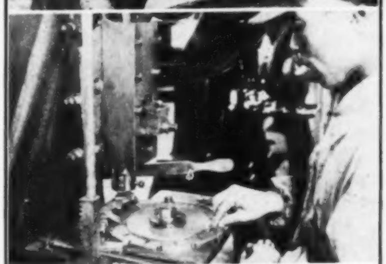


Tubing Hard Rubber

Rubber Vulcanizing Room



Automatic Turret Lathe



Stamping Gold Pen Blanks

Cutting Gold Pen Nibs

THE manufacture of hard rubber fountain pens in Japan was begun by the Namiki Manufacturing Co., Ltd., of Tokyo, in 1918. At that time the office and plant of the company was contained in a single room 12 by 18 feet and its operations were conducted by ten people. From this exceedingly modest beginning there has been developed within ten years a highly specialized hard rubber factory whose owners kept constantly in mind that cooperation of manufacturer, dealer and consumer is requisite for the successful development of business.

Today this company occupies a four-story building of reinforced concrete, with 100,000 square feet of floor area equipped with the most modern machinery. It employs over 500 skilled workers in the manufacture of their laccanite rubber products of which the output of fountain pens alone exceeds 4,000,000 annually. Namiki not only has equipped the plant with efficient machinery but has placed even greater reliance on maintaining the friendly interest and spirit of their operatives to produce increasing excellence of quality and rapidity of business growth.

Fountain Pens

The ebonite basis of the fountain pens is manufactured by the usual well known mixing mills, tubing machines, vulcanizers, and accessory equipment commonly found in all modern rubber working plants. Glimpses of the well lighted rubber workrooms are seen in the accompanying group illustration which shows an electrically driven line of mills for compounding rubber stock; warming mills and a tubing machine for forming hard rubber rods and tubing; and the curing room with a number of well insulated steam vulcanizers.

Machining Ebonite

The manufacture of fountain pens from the vulcanized ebonite stock is a series of machinery operations carried out on hard rubber precisely as such work is done in small metal work. That is, by the use of lathes, drills, grinders, polishers, etc. One of the first machine operations done on the ebonite rods is the cutting to pen lengths and turning. This is accomplished in the automatic turret lathe shown.

Laccanite Finish

The fountain pens made by Namiki are distinguished by their finish in original designs executed in "laccanite." This is a special Japanese lacquer invented and perfected by this company for the protection of the hard rubber pens from becoming tarnished, and to render them fire, water and acid proof. In addition to this protective coating the goods are made very attractive by real Japanese lacquer work in relief.

Japanese lacquer differs entirely from any other lacquer, and if properly applied will stand the roughest handling as well as the elements. There are indeed very few real lacquer artists even in Japan, although this art has been practiced there over fifteen hundred years. Lacquer art is quite different from other arts, and the secret of it has been handed down from generation to generation. Namiki employs over 30 of these highly skilled lacquer artists who are regularly occupied in producing beautiful lacquer work on all their

products. Some of the elaborate lacquer designs on the pens require more than 35 days to complete.

Pen Points

Japan is one of the countries which has the best quality iridium and Hokkaido iridium is the best, being 62½ per cent pure. Namiki owns its own iridium mine in Hokkaido from which the material is obtained for all of its pens. The better the quality of iridium the smoother the pen will write, and the best iridium will last many years.

Two only, in the series of operations necessary in making iridium tipped gold pens, are pictured. These are stamping pen blanks, and cutting gold nibs which are shown in the group illustration.

In addition to their extensive line of lacquered ebonite pens the Namiki Manufacturing Co. manufactures many other articles besides pens, such as silver and gold cigarette cases, silver cigar lighters, watch cases, etc., which are all lacquered with beautiful designs.

Rubber Solvent Gasoline

Bruce C. Dodd[1]

A LITTLE more than a decade ago rubber solvent gasoline began to replace benzol in the manufacture of tires, tubes, and repair materials. It was all shipped from refineries located in the Ohio-Pennsylvania district. The crude was of such excellent quality that a very satisfactory product was made despite the crude type of refinery equipment used compared with that employed in the refineries of today.

One or two large refineries were making a very excellent grade of high test gasoline as motor fuel, etc., with an initial boiling point of approximately 40° C. and an end point of 160° C. Samples of this high test gasoline tested by Akron rubber manufacturers proved fully satisfactory as a substitute for benzol and although it possessed a few disadvantages, its advantage from a health standpoint and lower cost assured its use in large quantities.

The growth and development of the rubber and petroleum industries have been correspondingly rapid. In the latter industry this rapid development has followed two main lines: greatly increased volume of material used: and exceptionally great improvement in refinery equipment, permitting a radically improved quality in all petroleum products.

The rapid development of rubber solvent caused depletion of the volume of available high quality Pennsylvania crudes, and made it necessary for the refineries to arrange for adequate supplies from other sections of the United States. If advance in refining knowledge had not kept pace with this depletion of quality crude, greater difficulty would undoubtedly have been experienced than occurred in the change from Pennsylvania crude to that of the Oklahoma district made available by pipe lines.

Common difficulties experienced by the change of solvents at that time were slower drying of the same specifications material, the oily nature of the residue causing blisters, and failure of the cement to adhere consistenly at all times. It was found that lowering the end point of the solvent from 160° to 150-152° C. considerably reduced this difficulty. Finally the end point was lowered to 145° C. which further improved it.

There are three general types of crude oil known as paraffin base, asphalt base, and naphthenic base. Since rubber and various other industrial solvents are all of the general class known as naphthas, the naphthenic base crude is the most logical source especially since the paraffin base crudes of the East are being exhausted. The manufacture of the highest quality of industrial petroleum solvents for the rubber, paint, lacquer, dry cleaning and various other industries necessitates a thorough knowledge of refinery operation along those specific lines, also a fairly comprehensive knowledge of the manufacturing requirements of those industries.

One of the most important items in this connection is that in order to manufacture the highest quality rubber solvent, it is necessary to operate on one grade of crude only. Practically all refineries manufacturing motor fuels operate on more than one grade of crude. Pipe lines supplying crude to refineries far from the producing wells invariably gather their material from several pools. It has been found that each crude possesses a slightly different proportion of impurities which must be removed by the refining process. If a refiner does not have one crude only from which to manufacture his products, he is not in position to regulate his procedure for the maximum removal of undesirable portions of the material therefore, a refinery located where this unvarying high quality crude supply can be had uncontaminated has a great advantage.

Two perfected solvent materials are now used by the rubber industry. One, known as Rub-Sol, is used in the manufacture of tires, repair cements, rubberized cloth and shoe cements. This material has an initial of 40° C. and maximum end point of 145° C. These points are specified by tire manufacturers with very few exceptions. The advantage of this solvent are: (1) it is manufactured by an organization which makes only industrial petroleum solvents; (2) it is made from a straight high quality crude; and (3) it possesses exceptionally low boiling intermediate fractions. The most important points for tests in comparing qualities of two rubber solvents, so far as distillation range is concerned, are the 20, 50 and 80 per cent points. It is desirable that the 20 per cent point be as high as possible to secure the advantage of decreased odor, fire hazard and evaporation loss. The 50 and 80 per cent points should be as low as possible to increase drying speed and the ability to dissolve rubber.

A second product known as Dip-Sol finds use in the manufacture of rubber gloves, balloons, other dipped goods, shoe cement and rubberized fabrics. Dip-Sol has an initial boiling point of approximately 98° C. and final end point between 143 and 145° C. This is an extremely short boiling range material for a petroleum solvent. Its end point is the same as that of Rub-Sol but its initial is nearly 50° higher. It is exceptionally efficient for the manufacture of dipped goods because its high initial affords the advantages of much greater protection from blisters, considerably less evaporation loss in the dipping tank and in the manufacture of the cement. Its extremely low end point greatly increases production possibilities of the dip goods plant. The advantage of this material for the shoe cement and rubberized fabric industries is the fact that it dries in practically the same time as Rub-Sol and its higher initial, saves from 15 to 25 per cent of material by reduction of evaporation losses. The difference in odor between these two solvents is due entirely to the difference in their initial boiling points, the tendency to emit odor by the higher intial material being greatly reduced. However so far as odor is concerned, both products meet the odorless specifications required by several of the principal rubber manufacturers.

[1] Anderson-Prichard Oil Corp., Oklahoma City, Okla.

Dealers' Stocks of Automobile Tires

As of October 1, 1928[1]

Survey Shows That Dealers are Carrying More Tires Than a Year Ago—That They are Concentrating Greater Sales Effort on One Make of Tire—That Mail Order Houses are a Growing Factor in Tire Distribution

FINAL statistics compiled by the Rubber Division, and here tabulated, show the stocks of automobile casings, inner tubes, and solid and cushion tires held by dealers reporting on October 1, 1928, as compared to October 1, 1927. The final average number of casings per dealer is 64.8, an increase of 2.3 over the average in the preliminary report issued on October 11, 1928.

An analysis has been prepared of the reports from dealers having stocks of casings, and a comparison made to the survey of October 1, 1927. This year a smaller percentage of reports fell into the classes having less than 51 casings, and a greater percentage of reports fell into each class of dealers having more than 50 casings.

The number of dealers reporting stocks of solid or cushion tires on October 1, 1928, was 974 and the number of such tires reported on hand was 22,793, an average of 23.4 tires per dealer. This compared with 1,671 dealers on October 1, 1927, reporting 43,605 tires, or 26.1 tires per dealer.

The percentage of dealers having stocks of solid and cushion tires has steadily declined, as shown by October 1 reports, as follows: 1925, 5.77 per cent; 1926, 5.13 per cent; 1927, 4.86 per cent, and 1928, 3.65 per cent.

Dealers were asked to report whether they were handling one, two, three or more makes of tires. An analysis of the reports shows a greater percentage of dealers concentrating sales efforts on one make than in preceding years.

The average stock of automobile tires held by the average tire dealer in the United States on October 1, 1928, was 64.8 and the average number of inner tubes was 107.4. In the accompanying table the states have been reported in the geographic divisions recognized by the Bureau of the Census in its census returns. The group "Unallocated" has been added to include questionnaires for which the proper state allocation was not known, and to tabulate returns received too late to be included under the state named.

In the present survey, dealers were asked to report whether or not they sold tires on instalment. The following is an analysis of the affirmative replies to this question, by geographic divisions of the United States corresponding to those shown on

[1]Special Circular No. 2126, Rubber Division, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Dealers' Stocks of Automobile Tires

	October 1, 1927			October 1, 1928		
	Number	Dealers Reporting	Average Per Dealer	Number	Dealers Reporting	Average Per Dealer
Total casings (including balloons)	1,933,867	33,548	57.6	1,685,689	26,012	64.8
Balloon casings (alone)	726,627	23,699	30.7	764,187	17,378	44.0
Inner tubes	3,399,726	32,984	103.1	2,750,768	25,616	107.4
Solid and cushion tires	43,605	1,671	26.1	22,793	974	23.4

DEALERS' STOCKS OF AUTOMOBILE TIRES BY STATES, OCTOBER 1, 1928

	Total Casings			Balloon Tires		Inner Tubes		
	No. of Dealers Reporting	No. of Tires on Hand	Average No. Per Dealer	No. of Dealers Reporting	No. of Tires on Hand	No. of Dealers Reporting	No. of Tubes on Hand	Average No. Per Dealer
New England								
Maine	392	18,988	48.4	268	9,628	394	29,588	75.1
New Hampshire	111	6,548	58.9	80	2,906	111	9,636	86.8
Vermont	174	7,334	42.1	115	3,032	167	12,608	75.5
Massachusetts	823	71,411	86.8	628	36,783	825	116,501	141.2
Rhode Island	114	7,402	64.9	88	4,231	117	11,899	101.7
Connecticut	257	16,858	65.6	183	8,021	251	25,475	101.5
Middle Atlantic								
New York	1,275	94,198	73.9	955	47,834	1,256	147,903	117.7
New Jersey	583	40,652	69.7	425	22,881	569	62,596	110.0
Pennsylvania	2,365	135,134	57.2	1,618	68,122	2,329	219,335	94.2
East North Central								
Ohio	1,132	71,757	63.4	729	33,120	1,113	109,792	98.6
Indiana	991	56,534	57.0	616	25,629	969	107,717	111.1
Illinois	1,330	81,307	61.1	926	36,982	1,320	135,739	102.8
Michigan	1,035	68,295	65.1	691	30,066	1,014	132,310	130.4
Wisconsin	1,015	56,896	56.1	698	22,498	1,000	94,866	94.8
West North Central								
Minnesota	799	40,014	50.0	543	15,712	792	73,911	93.3
Iowa	1,040	60,890	58.5	693	25,923	1,016	101,607	100.0
Missouri	860	69,035	80.2	549	32,899	804	104,155	129.5
North Dakota	404	17,971	44.4	261	7,589	395	34,633	87.7
South Dakota	288	14,072	48.8	190	5,314	285	24,559	86.2
Nebraska	589	39,581	67.2	369	12,285	586	60,573	103.4
Kansas	703	47,829	68.0	455	20,265	693	72,827	105.1
South Atlantic								
Delaware	51	4,475	87.7	29	1,869	51	7,716	151.2
Maryland	347	24,506	70.6	213	11,553	337	36,955	109.7
District Columbia	37	2,509	67.8	24	1,019	36	5,642	156.7
Virginia	620	30,492	49.2	326	10,148	603	44,286	88.4
West Virginia	340	17,483	51.4	212	8,730	330	27,782	84.5
North Carolina	373	24,825	66.6	230	9,149	369	40,720	110.4
South Carolina	271	12,529	46.2	175	5,041	268	26,114	97.4
Georgia	311	24,505	78.7	212	10,889	308	44,039	142.9
Florida	299	37,505	125.4	211	21,613	297	49,335	166.1
East South Central								
Kentucky	313	17,409	55.6	195	8,051	311	31,195	100.3
Tennessee	256	21,558	84.2	156	8,420	255	32,605	127.8
Alabama	338	22,196	65.6	205	9,190	333	38,079	114.3
Mississippi	278	15,762	56.7	176	5,394	268	28,218	105.3
West South Central								
Arkansas	319	19,809	62.1	174	7,277	314	28,722	91.5
Louisiana	220	17,547	79.8	139	8,776	213	32,449	152.3
Oklahoma	405	37,772	93.3	279	18,619	401	58,357	145.5
Texas	1,221	91,991	75.3	810	38,330	1,222	156,310	127.9
Mountain								
Montana	256	15,920	62.2	167	6,388	251	26,042	103.8
Idaho	169	8,765	51.9	115	3,865	161	13,147	81.7
Wyoming	72	3,768	52.3	43	1,553	70	6,170	88.1
Colorado	382	14,719	38.5	254	7,208	382	24,666	64.6
New Mexico	119	6,235	52.4	64	2,575	116	9,515	82.0
Arizona	156	10,611	68.0	102	4,494	153	15,279	99.8
Utah	177	13,583	76.8	120	7,396	170	20,775	157.5
Nevada	44	2,326	52.9	30	1,082	43	4,127	95.9
Pacific								
Washington	588	37,499	63.8	405	14,699	586	55,839	95.3
Oregon	313	20,264	64.7	222	8,638	309	27,363	88.6
California	1,241	93,734	75.5	887	45,023	1,236	149,765	124.0
Unallocated	216	12,686	58.7	123	5,478	217	21,326	98.3
Total U. S.	26,012	1,685,689	64.8	17,378	764,187	25,616	2,750,768	107.4

the preceding page. The largest percentage of dealers selling on instalment was in the East South Central States.

GEOGRAPHIC DIVISIONS	Per Cent of Total Dealers Selling on Instalment
New England	23.68
Middle Atlantic	20.41
East North Central	21.79
West North Central	19.45
South Atlantic	23.90
East South Central	31.22
West South Central	28.27
Mountain	23.27
Pacific	19.23
Total United States	22.32

Reports received from two mail order houses and from another large company which operates numerous chain stores, make it possible for the first time to publish statistics of such stocks without disclosure of the individual position of any company.

Companies reporting	3
Total casings	615,508
Balloon casings only	284.913
Total inner tubes	730,889

These statistics show that on the average, these companies held 1.19 inner tubes for each casing, and that 46.2 per cent of casings on hand were balloon tires.

Some Causes of Curing Troubles

A rubber engineer of long experience notes that in many cases serious variations in curing time, often resulting in defective products, can be blamed on a too confident reliance on the accuracy of steam gages. While it is conceded that the more modern type of instruments are usually very dependable, those of older design are often quite faulty, and especially if they have been subjected to long, severe use. Many a vulcanizer in trying to carry out an indicated cure for a compound at, say, 237.2 degrees F., the melting point of sulphur and at which in the absence of very active accelerators vulcanization should begin, is unknowingly handicapped by his gage giving only an apparent registry of that temperature while several degrees plus or minus the true figure. Cases are known where gages have been from 5 to 15 degrees wrong. Thus, despite the utmost care in timing, the result may be an over or an under-cure. The suggested remedy is frequent calibration of gages.

Another common mistake is said to be too large a variety of gages in a factory. Standardizing on one good make is advised to insure more accurate readings in milling and curing rooms. Even when gages give perfect readings, rate of cure may be unfavorably influenced by water in steam quite unknown to the vulcanizer. Still another factor in curing often unnoticed is variation in thickness of mold walls. A rubber "mix" is often very sensitive to lack of uniformity in heat capacity and conductivity of the metal molds.

Damp Steam Spoils Colors

Colored rubber goods, particularly carpeting, can easily be spoiled in the making if wet steam reaches the sheeted compound during curing. The effect of the damp steam is shown in water-marked and discolored edges and often in dark patches across a sheet marking each revolution of the vulcanizing drum. Some colors stand up better than others, but the ones that seem to give most trouble are ochre and ultramarine blue. Where colors have not been impaired thus but have become merely dulled during cure it is said that steady exposure to light and regular washing for three or four months will revive them surprisingly.

Footwear Factory Leaks

LARGE scrap heaps may often mean small dividends. In a large rubber shop making sport shoes an efficiency expert noted, for instance, that much of the binding was needlessly run through without canvas just to determine whether or not the binder was in order, that unused pieces at the beginning and end of each upper were very numerous, and that there was much unused binding between two tongues where they were bound one after another in long strings. It was noted, too, that there was much wastage of thread, usually due to careless rethreading of needles and to overwound bobbins the surplus thread being generally thrown away. Tongues, though cut from scrap canvas, had been much in excess of needs and wasted much binding and thread. Too large a proportion of cartons had been mishandled or allowed to become unfit for use, fiber cases for packing cartons had been sealed with an excess of canvas taping or the trimmings had been too long, while in labels the wastage had been fully 50 per cent. The loss of piping drawn off in excess of needs or allowed to fall into floor rubbish was also considerable.

Fault was also found with the practice of cutting up too many insoles to allow for possible spoilage and with storing up the unused stock until it had often become hard and unusable or unavailable because of style changes. In cutting soling of many different qualities the scrap had often become mixed, the result being obvious, as when scrap black stocks having different accelerating compositions had become mixed in reworking. A clearing house was suggested for rubber waste, as well as a closer watch on the piece work system, which ordinarily stresses volume of work rather than the avoidance of waste. Variations in fabric widths also accounted for much waste by making it difficult to space dies so as to avoid cutting irregular shapes near the edges.

It was also noted that rerunning rubber may not only increase work unnecessarily in the mill room, but may even mean disorganization of the day's work throughout the shop. The remedy for short delivery on the part of the mill room, and the corrective of other wasteful practices, is to require all stock to be checked up and to hold the foremen or other receivers accountable for all materials, while also requiring regular and accurate reports on all scrap left over. In that way, it is claimed, wastage and its causes may be easily traced, responsibility fixed, and a more comprehensive picture obtained of actual cost of production.

Less Rubber for Tires and Tubes

Statistics lately compiled by the United States Census Bureau show that 232,270 tons of crude rubber were used in 1927 for tires, 51,245 for tubes, 15,702 for solid and cushion tires and solid tiring, and 1,176 for motor cycle and bicycle casings and tubes. Less rubber was used in 1927 than in 1925 for both pneumatic casings and tubes, the 1925 casing taking about 9 pounds and the 1927 one 8.19; and while the 1925 tube took about 1.9 pounds the 1927 one took 1.63 pounds. The solid and cushion tires of 1927, however, appear to have averaged 43.2 pounds apiece, while those of 1925 had but 40 pounds.

The tire industry used 316,295 tons of crude in 1927 as compared with 335,873 in 1925. The 1927 crude used in tire making included 302,643 tons of plantation, 3,861 of Para, and 9,791 of caucho, guayule, and Africans. While total production was 8.1 per cent higher in 1927 than in 1925, crude rubber consumed was 5.8 per cent less. In addition to the crude, 105,754 tons of reclaimed rubber were used by the tire industry in 1927, but the proportion used for tires and tubes is not given separately.

Inflatable Rubber Toys

JOSEPH ROSSMAN

SEVERAL interesting patents have been granted during the last two years for making inflatable rubber toys by simultaneously uniting and cutting two or more superimposed sheets of rubber. The broad idea of uniting two sheets of rubber in this manner is well known. It was disclosed in U. S. Patent No. 22,345 granted in 1879 to William Carr, where the two

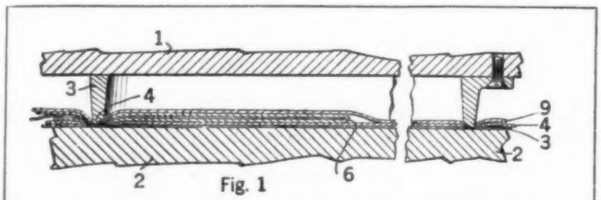


Fig. 1

sheets of rubber or other gum, or one sheet folded double, are laid flat upon a cushion pasteboard, felt, lead, or other suitable material, placed upon a table. The rubber or other gum must be only partly cured or not cured at all, so that it will be adhesive under pressure. The knife or beveled edge die is placed over the rubber which receives a smart blow with a mallet or other tool or means, and is thereby forced through the rubber or other gum, cutting it at one operation in the desired manner, and at the same time pressing the cut edges tightly together by means of the bevel.

According to Carr's process, only very simple toys can be produced. In the recent U. S. Patent No. 1,625,394 to Roberts a process is disclosed in which several surmounting seams can be made in one operation. This method is available in the manufacture of various sheet rubber articles in which different sheets of rubber are joined in different regions. Thus, where there are four sheets, the top and bottom sheets may be joined together in one region and in another region the top and second sheet and the third and bottom sheet. It is thus possible to manufacture in one operation, four-legged sheet rubber animals and various other toys having legs or extensions side by side.

Referring to Figure 1, the upper or stationary platen of a forming press is indicated at 1, and the lower platen at 2. This is adapted to be raised by a hydraulic ram. The die 3 is a strap of metal bent into a form corresponding to the outline of the figure to be produced, and fixed to the upper platen. The active face 4 of the die is beveled inwardly and is comparatively narrow, and for strength the die may be flared or thickened from this face toward the back.

Figure 2 shows three rolls of sheet material mounted on axles rotatably held in a standard adjacent the press. The roll 2 comprises a strip of paper 3 and a surmounting sheet of rubber 4. The roll 5 comprises a double sheet of rubber 6 and an intermediate separator 7. The upper roll 8 comprises a single sheet of rubber 9. The material passes from the three rolls across three corresponding guiding rollers.

In operation, assuming that the die has been secured to the upper platen, the material is drawn from the three rolls across the press as shown in Figure 2. Thus, as illustrated in Figure 1, there is the lower platen 2, first a sheet of paper 3, then above this a sheet of rubber 4, both coming from the roll 2 in Figure 2. Above this there is a doubled sheet of rubber 6 separated by an intermediate separator 7. These parts come from the roll 5 and extend to a greater or less distance from the edge of the pile of sheets according to the article to be produced. In the present instance they extend slightly higher than the region of the legs of the animal to be made, the top line of the doubled sheet being indicated in Figure 3 by the dotted line. Above the doubled sheet the top layer 9 from the roll 8, this top layer resting on the upper layer of the doubled sheet 6 throughout the region of the latter and beyond that resting directly on the lower rubber sheet 4.

When the sheets have been surmounted the pressure is admitted to the hydraulic cylinder, thus elevating the lower platen with the sheets into coaction with the suspended die. High pressure fluid is then admitted to the cylinder, causing the platen to be further elevated so that the outer edge of the die cuts through the various sheets and at the same time the beveled face presses one sheet of rubber into the material of the adjacent sheet to form a seam directly beneath the beveled face.

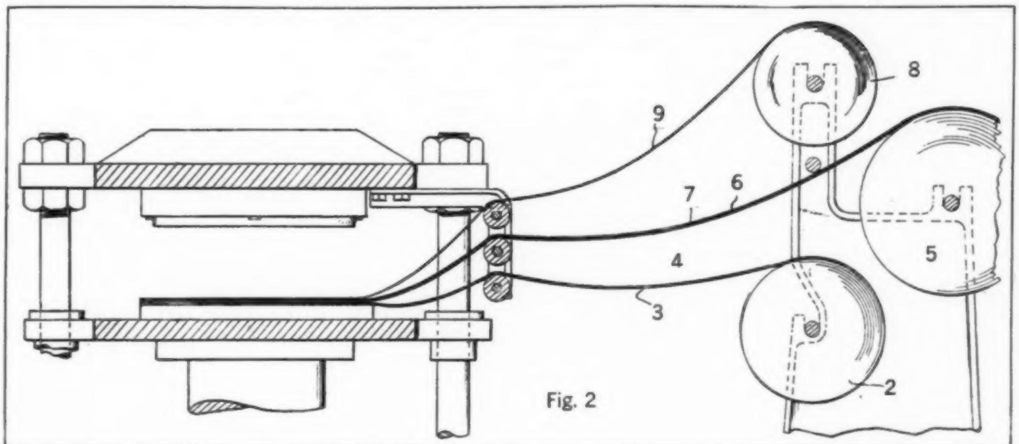


Fig. 2

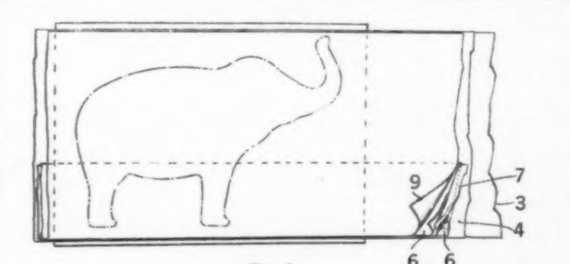


Fig. 3

It is desirable to make the angle of the beveled face steeper where such edge cuts through the four thicknesses of rubber than in the region where it cuts through but two thicknesses.

The inner or higher edge of the bevel is preferably located above the lower edge by an amount corresponding to half the combined thickness of the rubber to be cut by that region of the die face, so that each adjacent pair of sheets at the seam is caused to occupy approximately the thickness of a single sheet, each sheet of rubber being thus intimately forced into the other sheet, making a homogeneous seam, which after vulcanization is as strong as the unseamed portion of the article.

After the die operation described, the lower platen is dropped, and the joined and cut out biscuit removed, the separators removed from between the two layers of the doubled sheet and the article is vulcanized in any suitable manner. The raw rubber is treated with starch or soapstone, which prevents the sheets adhering when piled on top of each other or when rolled up in the roll. Notwithstanding this, the hydraulic pressure is sufficient to actually force one sheet into the other so that any soapstone or starch on the seam is immaterial, as it becomes entirely embedded in the rubber.

It is important to provide a padding beneath the bottom sheet so that the edge of the die may cut entirely through the bottom sheet of rubber. Ordinary wrapping paper serves well for this purpose. The same material may be used for the separator between the two layers of the doubled intermediate sheet. It is important to prevent the formation of a seam between the two leaves of the doubled sheet. The hydraulic pressure forces the cutting edge through the rubber and through whatever separator is employed until the edge enters the layer of padding.

Very satisfactory results have been obtained by using a pressure of a thousand pounds per square inch on a hydraulic ram 10 inches in diameter, thus giving a total pressure of approximately 78,500 pounds. Distributed over the total area of the outline face of the die with this face about a sixteenth of an inch in width, if the length of the outline were about 42 inches, the effective pressure on the seam would be in the vicinity of 30,000 pounds per square inch.

The seaming and cutting operation gives a biscuit wherein the major portion is composed of two sheets of rubber while in the lower portion four layers, thus providing individual separated legs. The doubled edge of the inserted layer comes slightly above the belly of the animal, thus providing two belly seams and giving a certain width to this portion of the toy when it is blown up. Following the curing of the biscuit a suitable representation of the animal or article corresponding to the outline is printed, in the present instance indicating the ears, eyes, tusks, etc.

At some suitable part of the article, as for instance in the point of the trunk, an inflating bushing or nipple is mounted whereby the toy may be inflated. Any suitable inflating bushing may be employed, but it is preferred to employ one which acts as its own valve, preventing the escape of air. This may be readily made by taking a short section of rubber tube, flattening the inner portion and vulcanizing it in this condition, then inserting it in the article, as for instance in the end of the trunk, and putting a rubber band about the exterior. The toy produced by the process described has material advantages over sheet rubber toys composed of only two sheets, as they will stand upright.

This process has been extended for producing rubber bladders. In U. S. Patent No. 1,668,782 a pile of rubber sheets is formed in which there is an upper sheet and a lower sheet extending for the full width of one of the lenticular sections, and between these sheets are inserted two doubled sheets from opposite sides with their folds adjacent, and with their leaves held apart by separators. This pile is cut through with a lenticular outline die which not only cuts out the sheets, but by pressure of the narrow beveled face of the die joins the upper sheet to each of the upper leaves of the doubled sheets and the lower sheet to each of the lower leaves of the doubled sheets.

The Roberts process can also be adapted for forming annular inner tubes as disclosed in U. S. Patent No. 1,606,665.

The following abstracts give a survey of the United States patents for making hollow rubber toys:

1. Carr, 222,345. December 9, 1879. This invention relates to the treatment of sheets of rubber or other gum which are to be cut into suitable shapes and united at the edges to form bags, balloons, articles of wearing apparel or other goods. It consists in means for simultaneously cutting and firmly uniting in one operation the edges of two pieces of india rubber. A cutting tool of proper shape is used which is beveled at its edges to operate it in connection with a cushioned support for the two pieces of rubber.

2. Smith, 254,716. March 7, 1882. Making hollow articles of rubber by pressing the separate halves or parts in suitable molds or dies between sheet metal and foil, then removing the foil from surfaces which are to be joined together, uniting the parts under pressure, and vulcanizing the hollow article in water under pressure, the water being admitted to the interior to prevent collapsing.

3. Mitzel, 663,634. December 11, 1900. Making elastic inflatable rubber bags, for striking, footballs, etc., which consists in forming the bags from a siccative solution of rubber by repetitions of the dipping process to secure the desired thickness, forming an inflating tube integral and simultaneously therewith, then dipping it in a curing bath to harden the gum, making an incision in the bag distant from the tube and cementing a patch on the incision.

4. Miller, 687,249. November 26, 1901. Manufacturing seamless hollow rubber articles which consists in first forming a body portion and a neck or stem by dipping a suitable form in a bath of rubber, then stripping the article so formed from the form, then turning the neck or stem within the interior of the body portion, and finally inserting a suitable closing plug in the neck or stem.

5. Berstorff and Meyer, 689,157. December 17, 1901. The process of making rubber balls and other like hollow bodies by forming a central cylindrical part by pressing into cup-shape form two disks, connecting the disks together at their bases and cutting away the central portion of the bases to form inwardly extending flanges, afterward securing end pieces to the ends of the cylindrical part and finally inflating the hollow body thus formed.

6. Roberts, 1,146,523. July 13, 1915. Making inflated rubber balls which consists in first forming cup-shaped halves whereof each has around its mouth a radially projecting flange thinner at its outer edge than where it unites with the body of the half, then bringing the halves together edge to edge in a chamber wherein they are subjected to compressed air internally, then pressing the edges against each other and the flanges into contact with each other and meanwhile subjecting them to the curing process while the air pressure is maintained in the ball, then reducing the air pressure in the chamber and removing the balls from the mold, and finally cutting off the surrounding flanges.

7. Price, 1,209,644. December 19, 1916. Making hollow articles which consists in forming the wall of the article of sections of vulcanizable plastic material, applying plastic skin having no, or at least very little, sulphur to the confronting edges of respective sections, partially vulcanizing the sections, moistening the skins with sulphur chloride, assembling and uniting the sections to form the final product by pressing the moistened skins together, and finally vulcanizing the product.

8. Griffiths, 1,575,682. March 9, 1926. The invention includes the cutting from two superimposed rubber sheets, with a blunt edge, the outline of a body portion and extending therefrom limb portions. The limb portions may extend from various parts of the body portion. An envelope also cut from a double sheet is provided, having openings therein to accommodate the head, tail and limb portions of the animal. The tail or other part of the animal is then provided with a valve through which fluid such as air may be introduced, the air passing to every part of the inflatable toy, which expands into the envelope. Such a structure allows the legs to overlie each other and thus naturally simulate a quadruped.

9. Kelly and Fenlason, 1,595,006. Aug. 3, 1926. The method of manufacturing hollow articles of rubber, which consists in placing between layers of uncured rubber which has not been cut to form, a spacer constituting a die or core for shaping the interior of the article, thereafter subjecting the layers of rubber to the action of dies for pressing together those portions of the rubber layers unrestrained by the spacer or core, the dies constituting means for shaping and trimming the layers, next curing the rubber, and finally disintegrating the spacer or core by the action of a fluid and withdrawing it from the formed article, there being an aperture in the spacer through which the uncured layers of rubber are joined when subjected to pressure whereby the resultant article will consist of layers joined together along the margin of the spacer and at a point surrounding by the margin.

10. Hopkinson, 1,603,465. October 19, 1926. The process of making inflatable rubber articles which comprises disposing in the flat a bottom sheet of rubber containing material, disposing a plurality of strengthening and connecting elements in two ply relation on the sheet and adhesively uniting the lower ply of each element to the bottom sheet, superimposing a top sheet and adhesively uniting it in the flat to the upper ply of each element, and uniting the edges of the sheets at all points to form an inflatable body.

11. Bates and Soule, 1,606,865. November 16, 1926. The art of making hollow articles of plastic material comprising placing a pair of doubled sheets one within the other with their lines of fold adjacent, while preventing mutual adherence of the two leaves of the inner sheet but allowing adherence of the outer face of each of such leaves with the inner face of the adjacent leaf of the outer sheet, and then simultaneously joining the faces together by superimposed marginal seams.

12. Riley and Weimer, 1,610,156. December 7, 1926. A method of manufacturing an inflatable toy comprising cutting from sheet

material two figures, superimposing the cut out figures upon each other and seaming their edges so as to form a single inflatable compartment comprising a head, two bodies and two sets of limbs, the head extending from one of the bodies, vulcanizing the article and thereafter folding the compartment so that the bodies coincide, and then securing the bodies together.

13. Roberts, 1,612,651. December 28, 1926. Making hollow rubber articles comprising seating sheet stock for the parts of the article in mold cavities, embedding a whistle or like member having a substantially flat outer face in one of the seated sheets, placing a heat expanding substance in one of the rubber lined cavities, thereafter bringing the mold members together to join the article, then vulcanizing it in a mold with internal fluid pressure, and thereafter forming an opening through the wall of the article opposite the whistle or like member.

14. Roberts, 1,625,394. April 19, 1927. The process of making hollow rubber articles comprising superimposing a pair of raw rubber sheets with an inserted doubled sheet of rubber between them, the fold of the doubled sheet facing outwardly and the two leaves thereof being separated by removable material, pressing such superimposed and inserted sheets by an outline which joins the pair of sheets respectively to the two leaves of the doubled sheet on the side of the fold toward the free edges of the double sheet and joins the pair of sheets to each other on the opposite side of the fold, and simultaneously with such joining cutting through the different sheets, and thereafter removing the separator and vulcanizing the article.

15. Anderson, 1,625,582. April 19, 1927. The method of making hollow articles which consists in cutting sheets having faces of unvulcanized rubber to blanks of the desired size and shape, placing the blanks with their rubber faces face to face, and applying a vulcanizing heat to the blanks and simultaneously applying pressure to the exteriors of the blanks along the peripheries thereof and compressing the rubber faces and uniting the same in a vulcanized joint of less thickness than the combined thickness of the two blanks around the periphery of the article and along the line of pressure applied to it.

16. Colledanchise, 1,636,589. July 19, 1927. The improvement in the method of making a jointed toy which consists in forming in separable molds, from a hard-drying plastic mixture composed of comminuted material and an adhesive, two rows of body sections, each section being independent of the other, the molds being formed to impart diverging end faces and rounded external faces to the sections, interposing between the molds an elongated strip of open mesh fabric, pressing the molds against opposite sides of the strip while the mixture is plastic, thereby causing the inner faces of the sections to enter and fill the spaces bounded by the meshes of the fabric, and meet within the space, and allowing the sections to solidify and become rigid by drying, thereby causing them to adhere to and become integral with each other within the meshes of the fabric strip, the sections having rigid external surfaces adapted to support surface ornamentation.

17. Griffiths, 1,644,122. October 4, 1927. The method of forming hollow rubber articles which consists in folding a sheet of uncured rubber to embrace a relatively thin ring and to provide a layer overlying each opposite face of the ring, the ring having oppositely facing endless cutting and seaming ribs conforming in contour to the shape of the desired article, simultaneously severing the portions of the sheets lying inside of the ring on lines spaced from the cutting and seaming ribs, and seaming the edges together, folding an additional sheet of uncured rubber to embrace the covered ring and to provide an additional layer overlying the outer face of the remaining portion of each original layer, and subjecting the assembled layers to the pressure of opposing press members whereby the cutting and seaming ribs will sever and simultaneously join the inner and outer layer.

18. Roberts, 1,668,782. May 8, 1928. The method of making football bladders and similar articles, comprising placing between two sheets of rubber a pair of doubled sheets with their folds substantially abutting and with separators between the folds, then pressing such pile of sheets with a lenticular die, the longitudinal axis of which registers with the line of abutment, the die having a narrow edge beveled inwardly away from the sheets whereby the outward edge of the die cuts through the sheets while the bevel forms seams, and thereafter removing the separators from between the doubled sheets and vulcanizing the formed biscuit.

N. E. I. Exports

Rubber exports from Netherlands East Indies during the first eight months of 1928 were 176,116 tons compared with 178,341 for the same period in 1927. The latter figure includes wet native rubber for which a deduction of 33⅓ per cent is necessary.

Rubber Questionnaire

Third Quarter 1928*

	Long Tons			
Reclaimed Rubber	Inventory at End of Quarter	Production	Shipments	Consumption
Reclaimers solely (7)	3,183	21,467	21,909	.....
Manufacturers who also reclaim (25)	7,015	31,356	13,523	21,767
Other manufacturers (68)	4,765	.....	.....	18,476
Totals	14,963	52,823	35,432	40,243

	Long Tons		
Scrap Rubber	Inventory	Consumption	Due on Contract
Reclaimers solely (7)	37,664	38,560	20,326
Manufacturers who also reclaim (21)	23,065	27,738	20,091
Other manufacturers (15)	287	.....	.....
Totals	61,016	66,298	40,417

TONS OF RUBBER CONSUMED IN RUBBER PRODUCTS AND TOTAL SALES VALUE OF SHIPMENTS

Products Tires and Tire Sundries:	Crude Rubber Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Automobile and motor truck pneumatic casings	72,065	$190,986
Automobile and motor truck pneumatic tubes	15,426	29,755
Motorcycle tires (casings and tubes)	117	585
Bicycle tires (single tubes, casings and tubes)	274	813
Aeroplane casings and tubes	55	118
Solid and cushion tires	3,488	7,219
All other solid tires	67	374
Tire sundries and repair materials	1,681	5,807
Totals	93,173	$235,657

Products Other Rubber Products:	Crude Rubber Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Mechanical rubber goods	4,711	$25,756
Boots and shoes	3,906	26,890
Insulated wire and insulating compounds	901	7,605
Druggists' sundries, medical, surgical rubber goods	433	2,310
Stationers' rubber goods	285	634
Bathing apparel	64	465
Rubber clothing	361	2,963
Automobile fabrics	254	2,380
Other rubberized fabrics	831	3,544
Hard rubber goods	294	2,157
Heels and soles	1,441	5,657
Rubber flooring	299	1,097
Sporting goods, toys and novelties	330	1,877
Miscellaneous, not included in any of the above items	884	3,861
Totals	14,994	$87,196
Grand totals—all products	108,167	$322,853

INVENTORY OF RUBBER IN THE UNITED STATES AND AFLOAT

	Long Tons			
On Hand	Plantation	Para	All Other	Totals
Manufacturers	50,714	2,345	1,369	54,428
Importers and dealers	12,679	599	1,023	14,301
Totals on hand	63,393	2,944	2,392	68,729
Afloat				
Manufacturers	15,492	3	8	15,503
Importers and dealers	27,555	434	....	27,989
Totals afloat	43,047	437	8	43,492

*Number of rubber manufacturers that reported data was 154; crude rubber importers and dealers, 46; reclaimers (solely), 7; total daily average number of employes on basis of third week of July, 1928, was 162,571.

It is estimated that the reported grand total crude rubber consumption and the grand total sales value figures to be approximately 92 per cent; the grand total crude rubber inventory and afloat figures 95 per cent; the reclaimed rubber production 93 per cent, reclaimed consumption 76 per cent and reclaimed inventory 78 per cent of the total for the entire industry.

Compiled from statistics supplied by the Rubber Association of America, Inc.

A Blooming British Rubber Product Showing Much Longer life than a similar article which was non-sulphuring, its maker concluded, with some show of reason, that the presence of a small amount of free sulphur was beneficial from an aging standpoint. He also ascribed cracking and flabbiness in such products as rubber floorings to minimum sulphur and maximum vulcanization used for producing goods that are merely nice looking.

EDITORIALS

Restriction's Beneficiaries Adrift

DESPITE the many misgivings expressed, the rubber industry absorbed the passing of restriction without a single shock. The six-year-old scheme had failed to rally from the official blow of six months ago, and passed away as painlessly as a mortal in sleep, leaving the planters who had idolized it back again in the cold, open world market where coddling counts for naught and price props get rudely jolted.

But what of the future of the market? Is it likely to remain quite a while in the doldrums with a low price range for perhaps a year? True, the exportable reserves from the whole restriction area may be but 75,000 tons, but the quantity of rubber still held back in the Dutch hinterland is undoubtedly considerable. Nor is account taken of the rubber which may soon be available from extensive new plantings encouraged by restriction, nor from the increasing output of reclaim steadily improving in quality and available now in important processes for which it had hitherto been deemed impossible. Also the fact that crude rubber percentage is being lowered through improved compounding may be no negligible factor in keeping the price of crude well within reasonable bounds.

Seeing Oxygen's Rubber Diffusion

BY using luminous bacteria as an indicator, the diffusion of oxygen through rubber may be readily viewed, according to *Science*. A test tube is completely filled with a dilute suspension of the bacteria and stoppered. If the stopper is made of glass the luminescence disappears completely. If, however, a rubber membrane be used as a stopper, the bacteria in contact with the membrane or within a short distance of it remain active and glow visibly. A comparison of the luminous columns will give an approximate estimate of the amount of oxygen diffusing through the rubber.

A Seven Thousand Pound Yield

A CONSTANT yield of 700 pounds of dry rubber per acre would be considered extraordinary on any plantation, yet an output per acre of even ten times that quantity is possible—and there's the rub, if the acre contained trees of the quality and age of the famous Hevea, Heneratgoda No. 2, planted in the old botanical garden near Colombo, Ceylon, a half century ago and grown from seed taken from Brazil to Kew Garden, London, by the late Sir Henry Wickham. The tree has averaged as much as 96 pounds of rubber per annum for five years, as compared with scarcely 4 pounds per annum from an ordinary tree. With 80 of No. 2 trees, an acre would hence yield over 7,000 pounds per annum; and yet, strange to say, the seeds of this queen of rubber trees have produced some of the poorest yielders on the Far East plantations.

Small Manufacturers' Chances

ACCORDING to returns for federal taxes, large corporations get by far the bulk of the profits of business. It is shown that 52 per cent of the total returns earned is made by one-quarter of one per cent of all business corporations; and one-twentieth of one per cent, or 215 out of 430,000 corporations earned 40 per cent of the total profits. It is held that the large corporations do a lucrative business not because they charge more or have monopolies, but because they can undersell rivals by producing and distributing at lower cost. In other words, their management is scientific.

The small manufacturer is not discouraged by such a showing if he be of the enterprising sort. In fact, he is glad to learn the facts in order that he may better adjust himself to the general trend. By noting changing conditions many small rubber concerns that had found themselves slipping regained a firm foothold and made steady advance. With some it involved a radical change in policy and methods, and with others it meant quitting lines that had yielded but little profit and could be produced more efficiently by the larger concerns, and concentrating on specialties in which they could easily excel larger competitors. Perhaps the best lesson they learned from the big combines was to scrap antiquated equipment and to modernize shop and office methods.

A Question of Cooperation

TIRE designers say that if they could put in as much time in studying casing structure as in mold planning they would produce a better product. Rubber chemists say that if engineers would quit making so many sizes and brands much could be done through chemical research toward making tires more serviceable. Also through simplification manufacturers are hoping to get more stable and profitable business, and through such economy consumers look for a lower price range. Surely a meeting ground could be found for all such important factors, who, though having much in common, yet so often work at cross purposes; and some means of cooperation be devised whereby all may be mutually helpful. The task of bringing about a better understanding may indeed be considerable, but it does not seem impossible.

What the Rubber Chemists Are Doing

Heat Transfer in Rubber Vulcanization[1]

THE vulcanization of rubber goods involves heating the rubber compound to definite vulcanization temperatures, and frequently the problem of obtaining the best cure is primarily a problem in heat transfer. The type of heat transfer involved is the so-called "unsteady state" flow, as contrasted with heat transfer in boilers, condensers, and other equipment where the temperatures at all points in the apparatus remain relatively constant.

As heat flows into the rubber a temperature gradient is set up from surface to interior, the points farthest from the source of heat being at the lowest temperature. Moreover, since the rubber through which the heat flows is being continually heated, the flow of heat passing planes parallel to the surface decreases as it flows towards the interior, and the temperature gradient is not linear. The interior is at first heated much more slowly than points near the surface. The modern tendency is towards short cures with highly accelerated stocks, but in many cases the shortening of the curing time is limited by the slowness with which the heat penetrates the rubber, making it impossible to cure the interior of the rubber mass in a short time, even though the compound be highly accelerated.

The temperature lag effect is found in the heating and cooling of all solid substances. It gives trouble in quenching steel billets, causing the surface to be hardened to a greater degree than the interior. The effect is greatest in large objects or in materials of low thermal conductivity. Temperature lag is important in heating all but the thinnest rubber goods, since the thermal conductivities of rubber compounds are relatively low, and is especially noticeable in heating heavy rubber articles such as truck tires. Figure 1 illustrates the magnitude of the effect for various thicknesses of red tube stock. As may be seen from this figure, point 4 which was 0.3 inch (7.6 mm.)

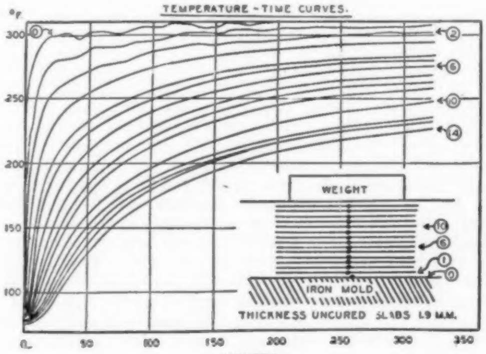


Fig. 1—Temperature Lag on Various Thicknesses of Red Tube Stock

from the mold face required 1 hour to reach 239° F. (115° C.), the melting point of sulphur, while points an inch (25.4 mm.) from the mold had not reached this temperature after 5 hours. It is not surprising, therefore, that cross sections of thick rubber objects show wide variations in cure.

The temperature lag in the laboratory vulcanization of a rubber sample is very different than in the plant vulcanization of a heavy rubber product, using the same compound. As an example, assume that laboratory tests indicate that for a particular accelerated compound the optimum cure at 40 pounds steam pressure (141° C.) is 15 minutes; it is quite possible that the point at which this compound is used in a thick rubber article may never reach the melting point of sulphur in the first 15 minutes of heating. The question then arises—how long should a compound subjected to a large temperature-lag effect be heated to obtain the optimum cure? In order to answer this question for a given case, we must have two things: (1) experimental data or accurate calculations giving the temperature-time curves for the points in question; and (2) a means of predicting the length of this rising temperature cure that will

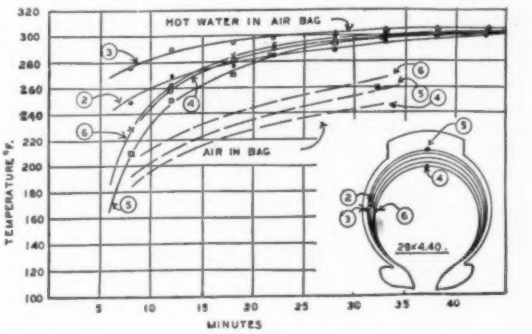


Fig. 2—Comparison of Temperature Lag with Air and with Hot Water in Airbag

give results comparable with those obtained in the laboratory tests at a practically constant temperature.

The important effects of the temperature lag in vulcanizing tires are two: (1) The curing time is extended to that necessary to vulcanize the rubber at the points farthest from the mold; (2) unevenness of cure in the product must result unless built up of an impractical number of compounds having different rates of cure. In most cases a properly cured tread surface can only be obtained along with an undercured friction stock, and if the carcass is properly cured the tread will be overcured. Perhaps the most striking illustration of the unevenness of cure is the appearance of tire cross sections which have stood long enough to bloom; many of them show the section near the tread surface to be black and tough, whereas the lower portion of the tread near the breaker shows excessive blooming. This effect is common in all sizes of tires cured on airbags. The unevenness of cure may be decreased by the "step-up rise" of steam temperature, but in so doing the time of cure is lengthened.

The actual loss due to the temperature lag in vulcanization processes varies from zero in a very thin sheet to 60-70 per cent of the cost of the compound itself in thick slabs, and in tire treads the loss doubtless runs into millions of dollars annually. Furthermore, the surface must be overcured to get the necessary average tensile strength, making the product more susceptible to aging.

The serious mistake is frequently made of thinking that the optimum time for the vulcanization of a rubber article of appreciable thickness is identical with the optimum time of vulcanization of the laboratory test piece. As pointed out above, in extreme cases the interior of the object may never reach the melting point of sulphur in the same time which will give the optimum cure in the laboratory mold.

One obvious means of making the vulcanization effect more uniform is to build the thick rubber object in several layers, those farthest from the source of heat being most highly accelerated. However, the degree of acceleration necessary in the interior of the rubber slab is usually only guessed at, and is frequently underestimated. Another method of attack in the vulcanization of tires is the application of heat to the interior as well as to the exterior of the tire carcass. A recent development is a hot-water curing method circulating water continu-

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[1]Paper presented before the Boston Group, Rubber Division, A. C. S., May 9, 1928. By T. K. Sherwood, Hood Rubber Co., Watertown, Mass., in collaboration with T. M. Knowland, development manager of the same company. Condensed from *Indus. & Engr. Chem.*, Nov., 1928, pp. 1181-5.

ously through the airbag at a high temperature and pressure. The water is heated to over 300° F. (149° C.) and pumped into the airbag at one side, leaving at a point diametrically opposite, having passed through both semicircles in parellel. Since the supply of hot water is continuous, the airbag is not cooled down in the process of heating the tire carcass, as was the case with most of the water-cure processes.

A comparison of the temperature lag effect with air and with hot water in the airbag is shown in Figure 2. The temperature-time curves are shown for a 29 by 4.40 balloon tire and on the same plot dotted curves indicate the average results of several tests for the same tire in the same mold with air in the bag. The temperatures of the rubber next to the mold face are practically the same for both methods of curing, all temperatures in the tire being cured with air in the bag lie between curve 3 and dotted curve 4, whereas the extreme variations when hot water is used are from curve 3 to curve 5 or 2. The effect in increasing the uniformity of cure is obvious, and the time of cure may be expected to be greatly decreased. The percentage reduction in time of cure possible with this method will depend on the tire size and the time of cure necessary on the airbag; for the small tire tested the time of cure was reduced by almost 50 per cent. Furthermore, the uneven blooming effect of the tire cross sections is eliminated by the water-cure process, at least in the smaller tire sizes.

Temperature and Humidity Control in Rubber Testing[1]

I—Stress-Strain and Tensile Properties

Abstract

THE investigation has proved that variations in temperature which may occur from day to day in an uncontrolled testing room may affect the physical tests to as great a degree as a 25 to 40 per cent change in the time of cure, while relative humidity affects the results only to a minor degree. Furthermore, variations in the absolute humidity of the room in which the unvulcanized rubber is stored between the time of mixing and the time of curing may affect the tensile strength and modulus of rubber compounds to as great a degree as does the temperature after curing.

It is therefore apparent that laboratory tests which are conducted under uncontrolled conditions of temperature and humidity may give highly erroneous results and may even give misinformation which is worse than no information at all. The committee therefore recommends that mixed stock prior to curing and cured stock prior to testing be conditioned for not less than 24 nor more than 28 hours at 82° ±2° F. (27.8° C.) and 45 ± 3 per cent relative humidity and that the testing room be maintained at 82° ±2° F. If a temperature of 82° F. cannot be maintained for conditioning the mixed stock prior to curing, the committee recommends a relative humidity corresponding to the temperature used which gives an absolute humidity equal to that obtained under the former conditions—namely, 5.24 grains of water per cubic foot of dry air (0.012 gram moisture per liter). The temperature of the testing room should be controlled within the above-stated limits, but it is not necessary to control the humidity of the entire room. A small conditioning cabinet in which the standard humidity is maintained has been found to be sufficient.

An investigation of the effect of variations and relative humidity before mixing showed only negligible differences in tensile and stress-strain properties, making it unnecessary to use more than ordinary care in storing rubber and compounding ingredients.

The committee wishes to point out that by controlling temperature and relative humidity only two of the many variables in rubber testing will be eliminated. True, these are two very important factors, but many others just as important were reported by the Physical Testing Committee of the Division of Rubber Chemistry in 1925. Before consistent results can be obtained all the variables will have to be controlled and before agreement between laboratories can be realized, standard procedures will have to be adopted.

[1]Report of Physical Testing Committee Division Rubber Chemistry, A. C. S., *Indus. & Eng. Chem.*, Nov., 1928, pp. 1245-73.

Determination of Sulphur in Rubber by Perchloric Acid Method[1]

IN a search for a rapid and accurate method for determining sulphur in rubber it was found that oxidation of the sample by means of sodium peroxide in the Parr bomb is unsatisfactory when the sulphur content of the rubber is low, because the samples that can be used for this purpose are too small for accurate results, or, if larger samples are used, the oxidation is incomplete.

The use of a mixture of nitric and perchloric acids, as described by Kahane, is also unsatisfactory; but with certain modifications the method may be made to yield very good results, and if fusions are unnecessary, it will save time and labor.

The chief modifications recommended are the use of a more dilute solution of nitric acid (equal volumes of the concentrated acid and water), allowing the rubber to dissolve completely on the steam bath before heating more strongly, then heating to gentle boiling until oxidation is complete, and finally destroying the residual nitric acid by means of hydrochloric acid.

The use of a larger flask (500 to 800 cc.) is also recommended, and suggestions are also made for the adaptation of this method to the analysis of those rubber compounds which contain barium, lead, etc.

It is recognized that this method, in its present form, has its limitations, and that there will undoubtedly be cases in which it will not be applicable. Nevertheless, in a large number of cases it should prove useful.

The method in full, as adopted for the writer's special purpose and as proposed for more general use, is as follows:

To a 1-gram sample of the finely divided or crumbled rubber in a 500-800-cc. Pyrex Kjeldahl flask (the larger size is preferable) add 10 cc. of a 41 per cent solution of nitric acid (1 volume concentrated acid and 1 volume water) and heat on a steam bath for 1 or 2 minutes until brown fumes appear and the reaction has subsided. Then add 10 cc. of concentrated nitric acid and continue heating for about 15 minutes more until rubber is nearly or entirely dissolved. Add 5 cc. of a 60 per cent solution of perchloric acid, set the flask in an inclined position on asbestos gauze, and heat with a burner to gentle boiling until dense white fumes appear and the solution (in absence of insoluble inorganic compounds) is clear and colorless or nearly so. At this point it may be necessary to add more perchloric acid (3 to 5 cc.) if free carbon is present, or, in absence of other precipitates, the carbon may be filtered off later. When all organic matter has been oxidized, allow to cool somewhat, add slowly 5 cc. of concentrated hydrochloric acid, and once more heat until white fumes appear, then allow to cool for a few minutes and wash into a beaker. If the solution is clear it may be heated at once (after diluting to about 200 cc.), treated with barium chloride, and the precipitate separated and weighed as barium sulphate in the usual manner. If the original free carbon of the rubber has not been completely oxidized, and it is known that no other insoluble matter is present, the carbon may be filtered off and the filtrate then treated for sulphates as before. If the liquor resulting from the oxidation of the rubber contains an insoluble residue, and it is known to be only barium sulphate, this may be filtered off, washed, ignited, and weighed as barium sulphate; or the insoluble residue, whatever its nature, may be filtered off, washed, dried, and fused with sodium carbonate, after which it is examined for sulphates, and possibly also for metals, according to the usual methods in such cases. Sulphates may also be extracted from any insoluble residue by boiling with sodium carbonate, as will be described in a later paper on the decomposition of barium sulphate by solutions of sodium carbonate. In either event, however, the filtrate from such insoluble residue should always be treated for sulphates as above.

The method as thus outlined will require considerably more time for oxidation of the sample than 7 or 8 minutes as claimed by Kahane; but no difficulty was experienced in completing the oxidation and (in absence of barium and lead) having the solution ready for treatment with barium chloride in 1.5 to 2 hours, which is still a considerable gain over the usual methods, besides requiring much less care and attention and avoiding some of the more objectionable operations which invite losses. Where highest accuracy is not required this period could be further shortened by eliminating the hydrochloric acid treatment without seriously affecting the final results.

[1]By Edward Wolesensky, Bureau of Standards, Washington, D. C. Condensed from *Indus. & Engr. Chem.*, Nov., 1928, pp. 1234-8.

American Rubber Technologists

Technical superintendents, chemists, process and development engineers in rubber manufacturing and reclaiming plants, research, testing and service laboratories are invited to send their biographical data to us for publication

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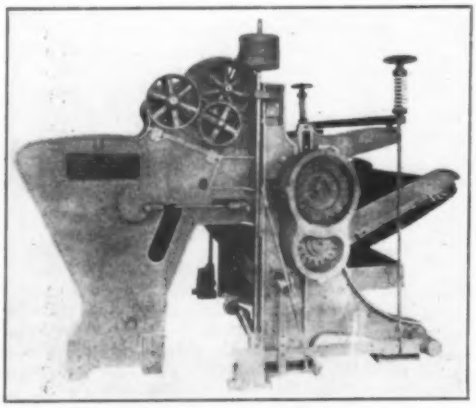
New Machines and Appliances

Reclaimed Rubber Water Eliminator

RAPID elimination of water from reclaimed rubber after its washing for removal of alkali, dirt, etc., is effected by the machine here depicted. It is in effect a press for continuously handling the material elevated by a broad endless chain elevator, the elevating means being bars connecting the side chains across the tank.

The material raised from the body of the water is thus passed over and descends to the bite of a pair of squeeze rolls, one iron and the other rubber covered. The squeeze rolls can be adjusted to desired pressure by hand wheels worked against spiral springs.

From the squeeze rolls the dewatered stock falls to an endless apron and is delivered minus 80 per cent of its water



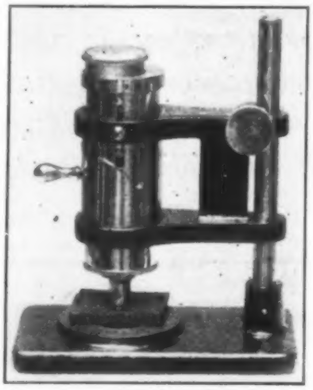
Sargent Reclaim Water Press

to a hot air continuous drier preparatory to further processing.

By this machine the maximum effect of the drier preceding it can be obtained.—C. G. Sargent's Sons Corp., Graniteville, Mass.

Rubber Hardness Tester

THE apparatus pictured in the illustration is designed for measuring the indentation hardness of cured rubber. It is direct reading and readily standardized. The apparatus consists of a vertical operating stem carrying a penetrator and weights which can be modified to suit the particular type of test within range of the apparatus. The motion of this stem is controlled by a cam which brings the combination to rest on the sample being tested. The amount of penetration is shown directly by the movement of the pointer carried on the barrel of the instrument. The indicator is in plain view and can be readily observed. The platform of the



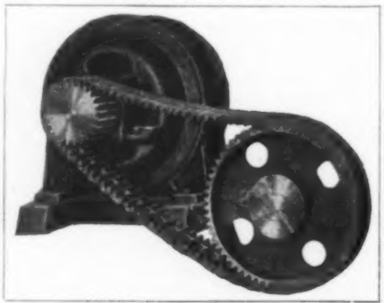
Olsen Rubber Tester

apparatus is left open to permit the projection of the penetrator below the base of the machine thus making it possible to test large objects by setting the apparatus on its surface. The zero setting of the instrument is secured by covering this opening with a glass plate and bringing the penetrator to rest on its surface. The dial is then adjusted for the zero position, after which the entire head can be set sufficiently to permit the insertion of test samples as desired.

The maker of this apparatus will furnish full information on request. — Tinius Olsen Testing Machine Co., 500 North 12th St., Philadelphia, Pa.

Silent Chain Power Transmission

THE silent chain drive here illustrated represents the latest development in that type of power transmission mechanism. It finds widely extended industrial



Link Belt Chain Drive

application in many lines including rubber manufacturing. The demand of drives from stock has made it necessary to increase the range of their power to 60 h.p. in practically any reduction from 1 to 1 to 7 to 1. The "drives from stock" represent but a limited range of the horse powers available for industry in general which run up to 1,000 h.p. and over.—Link Belt Co., 910 South Michigan Ave., Chicago, Ill.

Recording Controllers

A RECORDING controller for mold work is here depicted in connection with a pair of tire press vulcanizers. The general principles and mode of operation of this type of temperature control have been applied for many years in the rubber and other industries where critical heat treatment of products is conducted. These particular control devices are among the most successful and may be found in the service of many rubber plants making

Foxboro Temperature Control for Tire Vulcanizers

various lines of rubber goods including tires, footwear, mechanical rubber goods, etc.—The Foxboro Co., Foxboro, Mass.

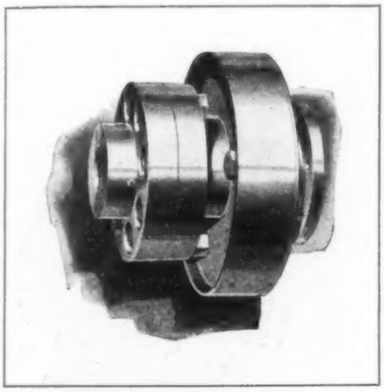
Worm Gear Speed Reducer

AN improved vertical type of heavy duty worm gear speed reducer is represented in the illustration. It is made to allow for vertical driving with the shaft projecting top or bottom.

The housing is of ample size, provided with a large oil cooling and heat radiating chamber. Timken bearings support both sides of the gear shaft and make for smooth operation. The worm shaft is mounted on double Timken bearings on one side, and Norma Hoffman roller bearings on the other. This bearing arrangement insures proper operation and the absorption of radial and end thrust loads eliminates excessive heating and reduces wear of both the worm and gear.

Gear shafts are made oversize to withstand emergency strains and starting loads. Worms and worm shafts are integral chrome nickel steel, heat treated and fully

relieved. Gears are made of high grade phosphor bronze, the larger sizes made up of a bronze ring, shrunk on and keyed to a cast iron spider.



High Duty Speed Reducer

This vertical type gear speed reducer applies particularly well on drives for rubber cement mixers, agitators, disk feeders and other equipments that rotate on a vertical axis.—D. O. James Mfg. Co., 1120 West Monroe St., Chicago, Ill.

Cement Mixer

THE illustration pictures a specially constructed type of rubber cement mixer. The machine has tightly fitted

Type "E" Cement Mixer

hinged covers to prevent evaporation of solvents, yet they can be easily and quickly opened to gain access to the interior of the mixer. The tank is heavily built, welded throughout and fully fitted with such conveniences as foundation lugs, gear guards, tight and loose pulleys, belt shifter and quick opening discharge cock. In order to facilitate solution the stirrers revolve between horizontal baffles projecting radially from the side walls.

These mixers are built in capacities ranging from 50 to 2,000 gallons and may be had with motor drive mounted on top of the tank.—The Patterson Foundry & Machine Co., E. Liverpool, O.

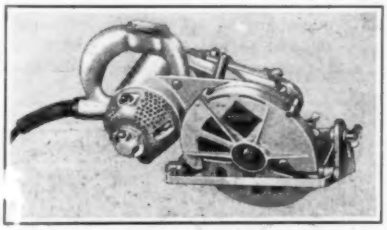
All-O

ALL-O is a soap of special quality prepared in standard strength liquid form for use as a rubber mold lubricant. It contains nothing in any way injurious to the molds, the surfaces of which it keeps in perfect polished condition thus facilitating clean molding of well finished articles without discoloration of the goods.

For rubber work it is applied to the hot molds by atomizer, brush or swab. The first three or four applications should be made full strength. Thereafter the material may be diluted as the needs of the work indicate, varying from half to one-eighth strength.

Electric Handsaw

A NEW small electric handsaw with cutting capacity of 2 inches and equipped with a safety guard is shown in the accompanying illustration. This port-



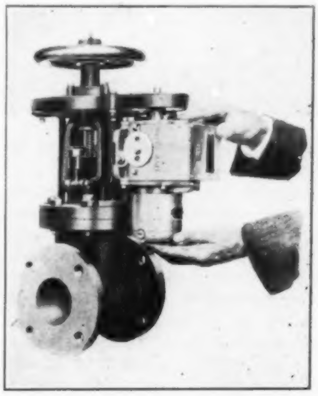
"Alta" Electric Handsaw

able electric tool is intended to displace the muscle-driven handsaw and is built in three models: one for plain square cutting; one for bevel cutting (see illustration), and one with adjustable dado cutter for grooving. On all three models the shoe is adjustable vertically, making it possible to set the saw to cut any required depth. It cuts all kinds of wood, soft metals, bakelite, hard rubber, etc.

A high-speed universal motor, fan-cooled, mounted on ball bearings, furnishes the power and shoots a blast of air to the front of the saw, thus clearing the sawdust away and making it possible to follow a line accurately. A handy steel saw table, 16 by 26 by 11 inches high, can be furnished, to which the saw can be attached, thereby adding greatly to the utility value of this handsaw.—Wappat Gear Works, Inc., 7522 Meade St., Pittsburgh, Pa.

Mechanism for Operating Valves

THE motor driven valve operating unit here pictured makes possible automatic operation of all valves up to 6 inches. Although so small that it can be held in one hand, this unique operating unit has a rating of 15 foot pounds. It can be operated automatically by means of float switches, temperature controlling devices, pressure regulators, etc., or by conveniently located push buttons. While designed primarily for valve operating service in industries where regulation of pressures and



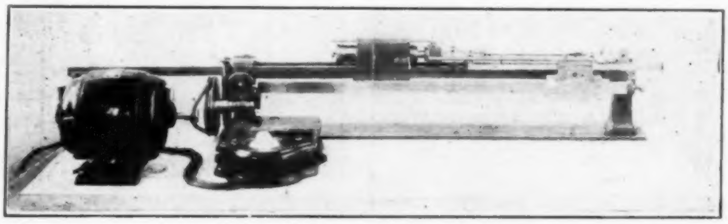
C-H Valve Operating Unit

temperatures of gases and fluids is necessary, it is likewise adaptable to many miscellaneous applications, such as operating skylights, awnings, radiators, garage doors, etc.—The Cutler-Hammer Mfg. Co., 1298 St. Paul Ave., Milwaukee, Wis.

THE USE OF CURRENT SUPPLIED BY central stations is increasing. In the rubber industry the percentage of horsepower of motors driven by purchased current to the total horsepower of electric motors installed is 68.7 per cent.

Schopper Strength Tester

THE motor driven testing device here illustrated is designed for measuring the strength of rubber covering of insulated wire, also rubber thread and tape. It is one of the so-called new Schob System testers of the spring dynamometer type with strength scale graduated in kilograms up to 20 kilos. The maximum stretch measuring length is 20 mm. The stretch scale is graduated to 150 mm.—H. Z. Schniewind, 72 Duane St., New York, N. Y.



Schob System Rubber Tester

Liquidometer

LIQUIDOMETERS require no introduction as they are admittedly the most accurate distance reading tank gage. The instrument here pictured

Liquidometer Attached to Tank

is adapted for giving long service in tanks containing various liquids ranging in viscosity from heavy printing ink to gasoline, also in tanks under pressure, vacuum and heated.

The instrument as shown may be installed in a tank with the dial reading instrument attached by a length of conduit which may be any length up to 150 feet. The instruments are not affected by temperature changes and may be used on any tank where the temperature of the liquid does not exceed 175 degrees F. No special skill is required to ascertain the contents of a tank. The dial is much like that of a clock and may be easily read.

The instrument gives accurate information as to the contents of a tank, what amount is being consumed, and what being added.—Liquidometer Co., 173 Thomson Ave., Long Island City, N. Y.

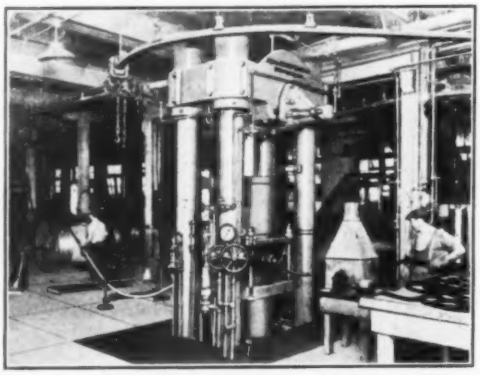
Lead Encasing Press for Vulcanizing Molded Hose

THE lead encasing process for vulcanizing rubber garden hose in long lengths is now used exclusively by practically all of the leading manufacturers of rubber garden hose in the United States and many in Europe. One of the latest installations in this country is the press equipped for the cold billet process, shown in the picture.

The cold billet process makes use of previously cast billets which are supplied to the press at a temperature of about 250° F. The lead melting pot is located at some distance from the press and three or more molds are used for casting the billets. Hoists and trolleys are required to lift the billets from the molds and convey them to the press.

The overhead trolley is usually arranged so that a supply of billets can be held between the press and melting pot. This takes care of any variation in the speeds at which the billets are cast at the melting pot and extruded by the press. No oven is necessary to maintain the heat of the billets as they lose their heat slowly and a small variation in the billet temperature has practically no effect on the extrusion cycle.

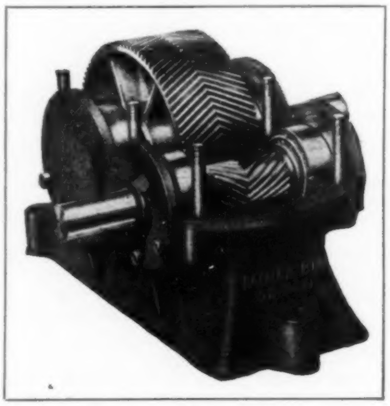
The press must be especially equipped to handle these billets. A swinging arm with a clamp is attached to one column of the press to receive the billet from the trolley and hold it ready to place in the extrusion cylinder. A special hydraulically operated double-acting slide is attached to the under side of the press head to carry the lead extrusion ram out of the way so as to permit the loading of the extrusion cylinder with the billet and then return the lead extrusion ram to its original position ready for the extrusion cycle. With the cold billet process and special equipment, the waiting or idle time of the press at the end of each extrusion charge is reduced to less than one minute, and the output of the press is increased more than one hundred per cent. Further details of the equipment may be obtained from the manufacturers.—John Robertson Co., Inc., 131 Water St., Brooklyn, N. Y.



2100-Ton Hose Press in the Manhattan Rubber Manufacturing Co.'s Plant, Passaic, N. J.

Herringbone Speed Reducer

THE herringbone speed reducer here illustrated meets the ever increasing demand for still stronger, more modern and efficient enclosed gear reduction units. The following items cover the special features of its construction: Anti-friction

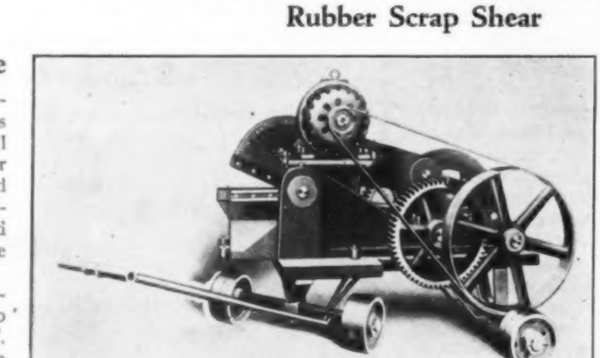


Palmer-Bee Speed Reducer

bearings are used throughout; ball bearings on the high speed, Hyatts on the intermediate and Timkens on the slow speed shaft. Gears are continuous-tooth herringbone with silent Kysor tooth form, producing more rolling and less sliding action than heretofore has been obtainable. The slow speed gears in the double and triple series are divided in the center, permitting a more symmetrical arrangement of the gearing and a uniform load on each bearing.

No outboard bearings are required for overhung loads up to the maximum rated capacity of the reducer. This feature is one of no little importance when the additional expense and inconvenience of including them in certain drive layouts are cnosidered. The efficiency of the single series reducers is approximately 99 per cent, and of the double series about 97 per cent.—Palmer-Bee Co., Detroit, Mich.

Rubber Scrap Shear



Canton Portable Power Shear

A MOST convenient and efficient rubber scrap cutter is here pictured. It is designed for portable use in rubber reclaiming plants for the preliminary cutting of pneumatic tires and other large and tough scrap. This shear makes 50 cuts a minute. It is provided with 24-inch cutting blades and has a jaw opening of 12¾ inches.

The machine is motor operated with belting connection to the shear mechanism. The whole is mounted on heavy low-built running gear and can be readily hauled by hand power to any convenient location around the scrap piie or elsewhere.—The Canton Foundry & Machine Co., Canton, O.

Editor's Book Table

Book Reviews

"Guide to the Preparation of Plantation Rubber." By B. J. Eaton, Rubber Research Institute of Malaya, Kyle, Palmer & Co., Ltd., Kuala Lumpur, Federated Malay States. Cloth, 54 + VII pp., 6 by 9½ inches, indexed.

The Rubber Research Institute of Malaya is concerned with fundamental research into the major problems of the rubber growing industry and the improvement of the detail of estate practice. This work is No. 1 of a series of manuals to be issued covering specialized knowledge in regard to advances in the technique of estate practice.

The present manual comprises eight sections and three appendices. The first three sections are devoted to field and factory operations of smoked sheet, pale crepe and sole crepe rubbers, respectively. Two sections are devoted to lower grade crepes and other types of first grade rubber. Packing of rubber, storage of chemicals and samples for investigation are each considered in special sections. Appendix A is a questionnaire concerning estate operation; B, discusses para-nitro-phenol as a mold preventive; and C comprises notes on the interpretation of vulcanization and other tests on rubber.

"The Budding of Hevea in Modern Plantation Practice." By F. Summers. Published by The Rubber Research Institute of Malaya, 1928. Cloth, 100 pages, 6 by 9½ inches, illustrated, indexed.

This volume is Planting Manual No. 2 of the Research Institute. It presents in simple fashion the facts of budding to the working planter, enabling him to form his own judgment regarding the best method in modern plantation practice. To this end the volume is a working manual in which the various operations are treated in detail. The book contains a bibliography of forty references.

"Annual Survey of American Chemistry." Vol. III, July 1, 1927, to July 1, 1928. Prepared under the auspices of the Division of Chemistry and Chemical Technology, National Research Council. Edited by Clarence J. West, director, Research Information Service, National Research Council. Published for National Research Council by the Chemical Catalog Co., Inc., New York, N. Y., 1928. Cloth, 395 pp., 5 by 8½ inches, indexed.

In this volume the developments in 46 subdivisions of chemical technology are reported each by a chemical authority in his subject. The advance in rubber chemisty is reviewed by Dr. Harry L. Fisher, research chemist, United States Rubber Co., who outlines the progress of rubber research as recorded in the publications of the past year. The topics treated are guayule, latex, chemical reactions of the rubber hydrocarbon, accelerators, aging compounding ingredients or pigments, physical properties and methods of testing and reclaimed rubber. Singmaster and Bryer report on zinc.

"Dispersoidological Investigations, XXIII." By Dr. P. P. von Weimarn and collaborators. Reports of the Imperial Industrial Research Institute, Department of Commerce and Industry, Osaka, Japan. Vol. IX, No. 5, August, 1928. Paper, 50 pages, 7½ by 10¼ inches. Illustrated with microphotographs.

In a series of four chapters the author discusses the structure of jellies and of other coagula of ammonia-preserved hevea latex and hevea vultex as follows: (1) On the shape, dimensions, structure and consistency of hevea latex and vultex particles. (2) Microscopical observations of the gelatination, and other forms of coagulation, of ammonia preserved hevea latex and vultex. (3) Micro and ultra-microscopical observations of the coagulation processes of ammonia preserved hevea latex and vultex. (4) Caoutchouc as a system composed of two isomers and caoutchouc as a chemical individual.

"Chemical Specifications Year Book, 1928." Compiled and edited by Chemical Specifications, Inc., M. N. Conklin, editor, Chemical Specifications, Inc., New York. Second edition, 1928. Cloth, 263 pp., 7½ by 10 inches.

This systematic collection of specifications covers the more important chemicals mentioning their nature and manufacture, detailed specifications and use. The data is derived from manufacturers, jobbers and importers and the entire compilation is of great value and interest to all those connected in any way with the chemical industry.

"Industrial Explorers." By Maurice Holland, director, Division of Engineering and Industrial Research, National Research Council, with Henry F. Pringle. Harper & Bros., New York and London, 1928. Cloth, 347 pages, 5½ by 8½ inches.

The authors of this volume have assembled a series of personal stories of discovery from eighteen of the nation's leaders of industrial research who are exploring the frontiers of knowledge and applying their discoveries for the advancement of industry and civilization. For it is true that "Today's discovery in the field of scientific theory inevitably leads to application in the practical field of industry tomorrow." The book is not only absorbingly interesting to the general reader but it has inspirational value to scientists as well.

A. S. T. M. Tentative Standards 1928. American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa. Paper, 932 pp., 6 by 9 inches. Indexed.

This volume contains 185 tentative specifications, methods of tests, definition of terms and recommended practices in effect at the time of its publication. A list of the standards and tentative standards of the society in effect Sept. 1, 1928, is included in this volume.

New Publications

"Schrader Tire Valves and Tire Gages—1928." This publication is the catalog of A. Schrader's Son, Inc., Brooklyn, N. Y., and provides manufacturers with detailed information regarding this company's tire valves, parts, accessories and service equipment for practical use. This information is classified in a series of illustrated bulletins, each thumb indexed for ready reference.

"Modern Tire Rebuilding." This four-page folder is issued by the De Mattia Bros. Division, Clifton, N. J., of the National Rubber Machinery Co., with general offices in Akron, O. The folder pictures a model tire rebuilding plant equipped exclusively by the National company. The possibilities of tire rebuilding as an attractive business is convincingly set forth.

"Patterson Agitators." This four-page bulletin, issued by The Patterson Foundry & Machine Co., E. Liverpool, O., describes and illustrates three types of agitators for use on rubber cement tanks and other solution mixers.

"Cleveland Hand or Electric Tram Rail." Issued by The Cleveland Crane & Engineering Co., Wickliffe, O., contains approximately 200 pages of the latest illustrated bulletins descriptive of the material handling systems based on the Cleveland tramrail and employing its accessories. The system is operated overhead and is applicable to virtually every industrial plant transportation problem both internal and external.

"The Flexing Test" is an attractively arranged booklet distributed by the Essex Rubber Co., Trenton, N. J. Profusely illustrated, its text describes the development and composition of the Wearite sole.

Annual Report of Director of the Bureau of Standards for Fiscal Year Ended June 30, 1928. This is an interesting record of the organization and activities of the Bureau of the Department of Commerce that functions in close contact with the progress of pure and applied science in the United States.

"Department of Agriculture Technical Reports for the Year 1927." This publication details the work done in Ceylon on plant diseases, insect pests, chemistry, economic botany and concludes with an account of the activities conducted at the central experiment station at Peradeniya.

"Annual Report of the Acting Director of the General Experimental Station of the A. V. R. O. S., July 1, 1927, to June 30, 1928." General Series No. 34. This recounts the year's activities in the botanical, chemical and agricultural departments, the program of work and communications of the general experimental station at Medan, Java.

"Chemicals." This eighty-four page pamphlet is the catalog of The Kalbfleisch Corp., 200 Fifth Ave., New York, N. Y., that for a century has been distinguished as a manufacturer of chemicals of superior quality for industrial uses. Among these stearic and sulphuric acids, carbon bisulphide and carbon tetrachloride are useful in the rubber industry.

"1928 Supplement to Book of A. S. T. M. Standards." Published by the American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa. Miscellaneous materials, Section D, has special interest for rubber chemists because of the inclusion of standard specifications on friction tape for general use for electrical purposes and numerous standard methods of tests of materials of more or less interest to the rubber technologist.

"The Rubber Exchange of New York, Inc., Third Annual Report, 1928." The operations of the exchange are reviewed by F. R. Henderson, president, who takes an optimistic view of the prospective activities for the first year under the removal of the British export ban on plantation rubber, saying that the "Rubber Exchange offers a medium for the full expression of market views or price-trend opinions, and is the only means of compelling a healthful situation in our rubber market."

Inventories

A. T. Hopkins

INVENTORIES more than any other single factor, assumed the responsibility for the calamities which befell American business in 1920-1921. Over-extension of credit was the basic cause of the depression of those years, but the effects reflected themselves most directly in the inventory account.

In good times and bad this item has always constituted one of the gravest business hazards and it continues to constitute such a hazard today—despite the fact that business as a whole has radically revised its inventory policy since 1921, and is now, as nearly as may be, on the well-known "hand-to-mouth" buying basis.

In spite of this policy, it was the inventory situation which was chiefly responsible for the automobile tire trade's distress of last spring, and this is due to the fact that a large inventory is entirely obligatory in this business, for the following reasons.

Crude rubber, being an import commodity, moves to this country from all parts of the world, but chiefly from the British and Dutch Colonies in the Far East. The geographic remoteness of the commodity's origin, therefore, makes it necessary for American tire producers to have at all times in warehouse or contracted for at least a four months' supply. At the same time, due to the strong seasonable tendencies in tire buying, it is necessary for the industry to carry, at certain periods of the year, large supplies of finished goods. Ordinarily, stocks of tires are being steadily built up during winter and early spring. If a radical change in crude material prices comes at a time when inventories are heavy, losses on finished goods must also be taken.

For a number of years past, inventories have constituted one of the tire industry's greatest sources of trouble. There was a serious decline in crude rubber prices in 1926, and another one last spring.

It is a fair assumption that with crude rubber prices now about 18 cents per pound, as compared with 40 cents early this year, and 80 cents early in 1926, the hazard attaching to the tire industry's necessarily large inventories is today considerably less than at any time in, say, the past five years. Over the next five years we should judge it probable that the trade's inventories would prove a source of profit more often than a source of loss.

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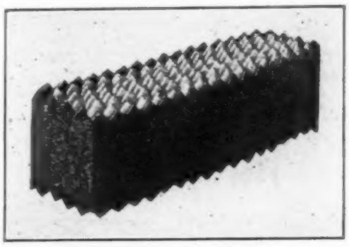
¶ ***To keep on growing, keep on learning. To keep on learning, read your business paper carefully each week.—Iron Age.***

New Goods and Specialties

Nail Brush

Made of pure crepe rubber with exceptional frictional properties, the nail



Rubber Brush

brush manufactured by St. Helens Cable & Rubber Co., Ltd., Slough, England, will clean hands rapidly and thoroughly. All dirt is quickly removed without injury to the skin. There are two sets of bristles to the brush, and a lather may be quickly formed. It floats upon the water and may be thoroughly cleaned by simply washing. Cellophane wrappers are used to pack the brushes, each brush being in a separate package.

Improved Household Glove

The Lincoln Rubber Glove Co., Akron, O., has developed a new glove, Silver King, which, since its introduction to the trade, has been one of the most popular numbers ever put out by the company. It is aluminum coated and the manufac-

Silver King

turer claims for it longer wearing qualities than the ordinary rubber glove.

Another new number in coral pink, made by an improved process, is of very fine texture, pleasing color and transparency that is especially attractive. The gloves are scientifically developed to assure greater resistance and durability.

Besides these numbers, the company also manufactures a full line of household and surgeon's rubber gloves, supplied in the above colors and orange, maroon and peach.

Elastic Wristband

An adjustable elastic wristband, Fitsrite, is made so that the right degree of pressure may be obtained without any adjustment excepting the band while it is on the wrist. The band is ventilating, washable and non-irritating. One size fits all wrists and it is supplied in three different colors or all white.—Fitsrite Products Co., 23 East 22 St., New York, N. Y.

New Galosh

Made to harmonize with every feminine ensemble and to fit every type of the new winter shoe heels, the latest galoshes put out by Goodyear's I. R. Glove Mfg. Co., Naugatuck, Conn., are particularly attractive. The overshoe illustrated, the Kelton, is made of worsted and rayon fabric in brown and gun metal. It has a snap fastener which can be adjusted to fit the particular foot and can be secured in four heel heights. The shoe is made in zephyr weight and can also be had fleece lined.

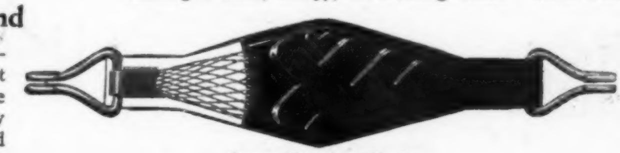
Kelton

Rubber Tire Chain

Because of its characteristic to grip, together with its extraordinary wearing qualities, rubber is more and more coming into general use in the construction of tire chains. The latest development is the Super-Service chain manufactured by the Trump Bros. Rubber Co., Akron, O.

A strong steel wire mesh interwoven in rubber electrically welded to the rubber insulated metal band that holds the side chain hook, is a unique feature in the construction of this new tire chain. This unusual construction not only uses the gripping and long wear advantages of rubber, but combines them with the interwoven steel wire mesh for strength against the terrific strain to which the tire chains are subjected.

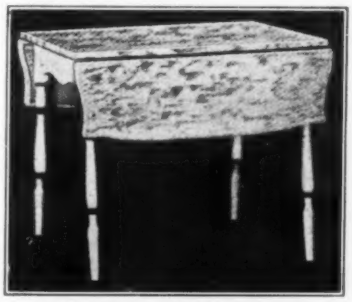
The diamond shape of the cross links is another unusual feature in that it permits the concentration of a large amount of rubber at the center of the cross link without making a thick, bumpy, hard riding chain.



Super-Service Chain

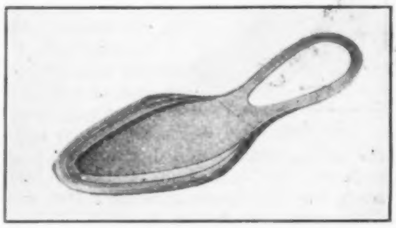
Rubber Top Table

A drop leaf, rubber top table is manufactured by the Souvenir & Cabinet



Breakfast Table With Rubber Top

Works, Milford, Ind., which is ideal for a breakfast set. The rubber, in artistic marble effect, is slipped on over a wood core, extends over the edges and snaps in a groove on the bottom side, preventing liquids from getting to the core. This also makes the top removable and easy to replace in case of damage in shipment. The corners are reinforced. The top edges of the leaves and center are slightly raised to prevent spilled liquids running off, adding practicability with beauty. It is made of high grade pure gum rubber and is constructed to wear for years. Noiseless and non-skid, the top is easily washed with hot water and soap and has withstood the most severe tests. Rubber tips, similar to crutch tips, are used on the legs.



Over-Sole

Foot Covering

A dainty emergency foot covering for wet weather, Over-Sole, is receiving the attention of women because of its wide adaptability. It is light and may easily be carried in the hand bag for use when needed. Over-Sole is made in the colors most worn for footwear: brown, midnight blue, neutral gray, beige and black. Only the sole is covered, ample protection for damp weather, and the slippers are in no danger of being marked or ruined. Over-Sole Rubber Corp., 9 South Clinton St., Chicago, Ill., is the manufacturer.

BLACK RED

Hard rubber desk sets with lacquered designs in gold and mother of pearl. Made by the Namiki Mfg. Co., 40 Rector St., New York, N. Y.

Tire Inflating Device

A tire going flat and marring a journey gives no worry, it is claimed, to the possessor of a "No-Pump," a unique device for instantly inflating a deflated tire, as well as for equalizing the pressure in all tires on a car, by borrowing air from a tire or tires having plenty of air and sharing the same with a tire or tires needing air. A "No-Pump" consists of twelve feet of heavy rubber tubing having valve caps at either end and manipulated by means of thumb pressure on a lever. The device not only gives quick relief until a service station can be reached, but also

No-Pump

by equi-balancing the air in all tires makes a car ride easier and makes application of brakes more positive and uniform.—Tom LeNay, inventor. No-Pump Mfg. Co., Harris Bldg., Main and 11th St., Los Angeles, Calif.

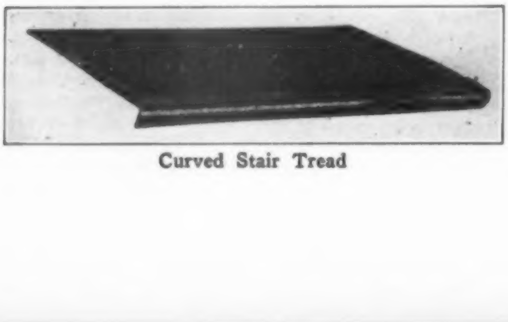
All-Rubber Gaiter

Rubber Galosh

An ideal foot protection for early fall wear is the illustrated all-rubber gaiter, which not only protects the shoe but the hose as well. It is light, easy to put on and take off, and presents a neat, fashionable appearance. For women it is made in Pearl and Polly lasts and half sizes, and for misses in Classic last and whole sizes only.—The Kaufman Rubber Co., Ltd., Kitchener, Ont.

Stair Tread

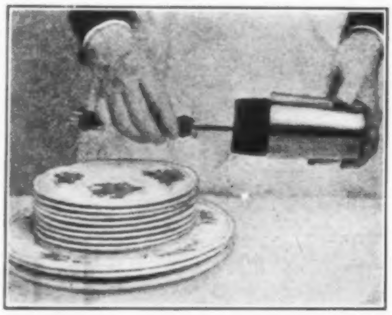
Made with a natural curve to fit around the edge of the step, the stair tread illustrated is new in design and entirely eliminates the metal nosing. It is designed with a corrugation to insure ease of cleaning and is strictly sanitary. The nosing is made of heavy rubber, an integral part of the tread, and curved to fit around the edge of the step. It is made in mahogany color only, in two sizes, nine by eighteen and nine by twenty-four inches.—The Rubber City Mfg. Co., 714 N. Main St., Akron, O.



Curved Stair Tread

For Washing Dishes

A handy little device, which is made from a rubber sponge to which a handle



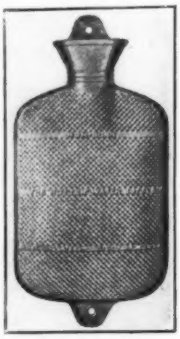
Sponge Dish Washer

has been added, solves the problem of getting into corners of glasses, bottles, jars, etc., when washing these articles. The handle may be lengthened to reach the bottom of tall pitchers, etc., by merely pressing a button. It has been found to save considerable time, and may be used on the ordinary dishes as well. The manufacturer is the Kristee Rubber Co., Akron, O.

Winter Tire

A new tire has been announced by the Dunlop Tire & Rubber Co., Buffalo, N. Y., which has been especially constructed for winter driving. It is made on the principle of a cleated shoe with sharp rectangular knobs raised on the standard tread in the same manner as cleats on a football shoe. The manufacturer features the great safety it affords motorists and pedestrians on ice and snow.

Hot Water Bottle

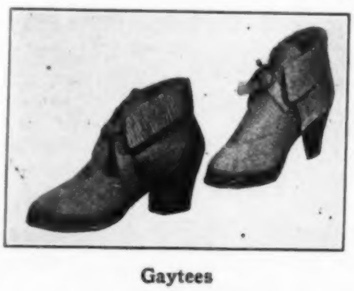


Non-Burn

Non-Burn, called by the manufacturer the hotter water bottle, may be laid next the skin, without towel or other wrapping, no matter how hot the water. The air cushion made by thermo-nubs protects the skin from burning and permits the air to circulate between the skin and the bottle. The air is heated by the bottle and thus dry hot air is produced. Hot air produces a rapid opening of the pores which is so essential in reducing pain. While signs of skin burn come from water or other heated elements at even low temperatures, the skin is much less susceptible to heated air. In Non-Burn it is safe to use water as hot as it is possible to get it. The manufacturer is Seiberling Latex Products Co., Akron, O.

Tailored Overshoes for Rain and Snow

Several new numbers have been added to the Gaytees line, the tailored overshoes made by the United States Rubber Co., 1790 Broadway, New York, N. Y. The two shown in the illustration are among



Gaytees

the most popular, combining elegance, serviceability and good taste.

Financial and Corporate News

Akron Rubber Stock Quotations

November 20, 1928

Company	Bid	Asked
Akron R. R.	18	22
Akron R. R., pfd.	..	95
Falls	6½	8¾
Faultless	32	33
Firestone	180	190
Firestone, 6% pfd.	110	112½
Firestone, 7% pfd.	107⅛	108½
General	184½	210
General, 6% pfd.	99	100
Goodrich	81	82
Goodrich, pfd.	111½	112½
Goodrich, 6½s	107¼	107½
Goodyear	83	84
Goodyear, 1st pfd.	99½	100½
Goodyear, 5s '28	99¾	100
Goodyear, 5½s '31	100⅛	101
Goodyear, 5s '57	93½	93⅝
India, com.	36	36½
India, 7% pfd.	..	97
Miller	20½	21½
Miller, 7% pfd.	74½	75
Mohawk	..	235
Mohawk, 7% pfd.	..	91
Rubber Service	..	40
Seiberling	48	49
Seiberling, 8% pfd.	107	108
Star	..	¾
Star, 8% pfd.	..	8

Legal

Adjudicated Patents

DOORCHECK AND STRAP, 1,678,499, 1,646,580, F. K. Eastman, doorcheck; 1,657,528, same, doorcheck strap, filed Aug. 29, 1928, D. C., N. D. Ohio, E. Div., Doc. 2664. The Concealed Door Check Co. v. The Firestone Tire & Rubber Co. *Official Gazette*, Vol. 375, p. 965.

Patent Suits

CORE, 1,566,014, F. L. Johnson, collapsible tire core; 1,618,153, same, collapsible-tire-building form, filed Aug. 21, 1928, D. C., N. D. Ohio, E. Div., Doc. 2662, F. L. Johnson et al v. The Bridgwater Machine Co. *Official Gazette*, Vol. 375, p. 721.

TIRES, 1,162,479 (a), A. H. Harris, method of manufacturing tires; 1,374,505, E. Hopkinson, method of making motor-vehicle tires; 1,480,719, J. R. Gammeter, method and apparatus for making or manipulating tires; 1,507,563, A. O. Abbott, jr., method and apparatus for manufacturing tire casings; 1,607,266, H. V. Lough, rubberized fabric and its method of manufacture, filed Sept. 11, 1928, D. C., N. D. Ohio, E. Div., Doc. 2669, United States Rubber Co. v. The Firestone Tire & Rubber Co. *Official Gazette*, Vol. 376, p. 5.

TIRES, 1,162,479 (b), A. H. Harris, method of manufacturing tires; 1,374,505, E. Hopkinson, method of making motor-vehicle tires; 1,480,719, J. R. Gammeter, method and apparatus for making or manipulating tires; 1,507,563, A. O. Abbott, jr., method and apparatus for manufacturing tire casings, D. C., N. D. Ohio, 7. Div., Doc. 2607, U. S. Rubber Co. et al. v. The Firestone Tire & Rubber Co. Dismissed without prejudice Sept. 13, 1928. *Official Gazette*, Vol. 376, p. 5.

Automobile Shows

The dates for the various important automobile shows have been selected and exhibitors and promoters are busy arranging details for the events. Following is a partial list of these exhibitions:

January 5-12 National Automobile Show, Grand Central Palace, New York City.
January 12-19 Newark, N. J.
January 12-19 Auditorium, Milwaukee, Wis.
January 13-19 Music Hall, Cincinnati, O.
January 26-February 2 National Automobile Show, Coliseum, Chicago, Ill.
March 2-9 Mechanics Bldg., Boston, Mass.

New York Stock Exchange Quotations

November 21, 1928

Company	High	Low	Last
Ajax	10	9⅝	9¾
Fisk	13⅞	12⅝	13
Fisk, 1st pfd.	69	69	69
Fisk, 1st pfd. cv.	69	69	69
Goodrich (4)	83¾	81⅛	81⅛
Goodrich, pfd. (7)	111⅜	111⅛	111⅛
Goodyear	91¾	86¼	88½
Goodyear, 1st pfd. (7)	102⅞	102	102
Intercontinental	10¾	9⅝	10⅝
Kelly-Springfield	20½	19⅞	19⅞
Kelly-Springfield, 6% pfd.	100	100	100
Kelly-Springfield, 8% pfd.	93	90	90
Lee	20⅞	20⅛	20⅝
Miller	21½	21	21
Norwalk	6¼	5⅝	6
U. S. Rubber	41⅜	39½	40
U. S. Rubber, 1st pfd.	70⅛	67¼	67¼

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Boston Woven H. & R.	Pfd.	$3.00 s.a.	Dec. 15	Dec. 1
Boston Woven H. & R.	Com.	$1.50 q.	Dec. 15	Dec. 1
Goodyear	1st cum. Pfd.	$1.75 q.	Jan. 1	Dec. 1
Goodyear	Pfd.	$1.75 q.	Jan. 1	Dec. 1
Hood	Pfd.	1¾% q.	Dec. 1	....
Mohawk	Com.	300% Stk.	....	....
Seiberling	Pfd.	$1.00	Dec. 15	Nov. 26

Dominion Rubber Co., Ltd.

Dominion Rubber Company, Ltd.'s (formerly the Consolidated Rubber Co., Ltd.) common stock will be subdivided on a four-for-one basis. Shareholders approved of the split-up at a special general meeting held on Nov. 14. The company has an authorized capital of 30,000 shares of common stock, which has been converted into 120,000 shares of no par value. The 30,000 shares of preferred stock will continue at $100 par value as at present.

New Incorporations

AMERICAN SYNTHETIC RUBBER CORP., Nov. 3 (New Jersey), capital stock is 5,000 shares no par value. H. Velleman, Hotel Ambassador, L. and S. Kanarvogel, 815 Girard Ave., all of New York, N. Y. Principal office, 4912 Blvd., West New York, N. J. To manufacture synthetic rubber and other substitutes for rubber.

CHOLERTON-MCTIGHE CORP., Nov. 8 (New Jersey), capital stock is 1,000 shares no par value. H. Velleman, Hotel Ambassador, L. and S. Kanarvogel, 815 Girard Ave., all of New York, N. Y. Principal office, 4912 Blvd., West New York, N. J. To manufacture rubber goods.

GLOBE IMPORT CO., INC., Nov. 13 (New York), capital stock is 200 shares no par value. J. Richter and H. F. Gompertz, both of 31 Union Sq., and J. M. Schwartz, 1 Madison Ave., all of New York, N. Y. Principal office, Manhattan. To deal in rubber.

K. C. RUBBER CO., Nov. 7 (New Jersey), capital stock is 100 shares no par value. S. D. Lewin, 12 E. 49th St., F. B. Weisberg, 163 W. 31st St., and R. Greenstein, 677 Blvd., all of Bayonne, N. J. Principal office, 752 Blvd., Bayonne, N. J. To manufacture rubber goods.

LAMBERT VULCANIZING WORKS, INC., Nov. 3 (New York), $20,000. A. Lambert, 306 E. 176th St., S. Lambert, 2030 Valentine Ave., and I. Lambert, 2015 Southern Blvd., all of Bronx, N. Y. Principal office, Bronx, N. Y. To vulcanize rubber goods.

I. J. LOUIS & CO., LTD., Nov. 1 (New York), capital stock is 2,150 shares, of which 2,000 shares are preferred par value $100 and 150 shares common stock no par value. I. J. Louis, 25 Beaver St., J. D. Frankel, 50 Broad St., and E. J. Schwabach, 60 Beaver St., all of New York, N. Y. Principal office, Manhattan. To deal in crude rubber.

NIAGARA RUBBER MFG. CO., INC., Nov. 14 (New York), capital stock is 200 shares no par value. C. M. Heimerl, 490 Winslow Ave., B. Kulowski, 397 Bird Ave., and I. B. Cohen, 1 Commonwealth Ave., all of Buffalo, N. Y. Principal office, Buffalo, N. Y. To deal in blow-out patches and scrap rubber.

H. ROTHSCHILD, INC., Nov. 14 (New York), capital stock is 100 shares no par value. H. Rothschild, 2038 Morris Ave., Bronx, J. Waldauer, 2074 E. 41st St., Brooklyn, and S. Rothschild, 1912 Potter Ave., Astoria, L. I., all of New York. Principal office, Manhattan. To deal in scrap rubber.

The Rubber Industry in America

Dr. Schidrowitz Honored

A dinner was tendered Dr. Philip Schidrowitz by the members of the Akron section of the American Chemical Society. Dr. Schidrowitz is well known in Akron as one of the leading English rubber technologists. He spoke on the industrial application of vulcanized latex and showed samples of gloves, inner tubes, and various kinds of sheet rubber of high quality which have been made from vulcanized latex.

About thirty members attended the dinner, which was a good gathering considering the fact that members of the Akron section had not been forewarned of Dr. Schidrowitz' arrival.

Southern Plant for Goodyear

It is said that the new plant unit which the Goodyear Tire & Rubber Co. plans to build in the South will be located in either Georgia or Alabama. A group of Goodyear officials has been inspecting sites in both states and a decision will be made during the month. An ultimate investment of several millions of dollars is involved and the plant, when in operation, will give employment to 2,500 men.

Akron Rubber Group Meeting

The fall meeting of the Akron Rubber Group will be held Dec. 3, 1928, at the Firestone Clubhouse, Akron, O. Dr. Bradford Noyes of the Taylor Instrument Co., Rochester, N. Y., will speak on "Temperature Control in the Rubber Industry." Dr. Noyes is an authority on this subject and his talk will be especially interesting to every one connected with the rubber industry. Dr. Noyes' address will be discussed by engineers from the Republic Rubber Co., Youngstown, O., The B. F. Goodrich Co., and The Goodyear Tire & Rubber Co., of Akron, O.

Dinner will be served at 6.30 p. m. Reservations may be made with J. P. Maider, Development Dept., The Goodyear Tire & Rubber Co., Akron, O.

Work Started on Akron Zeppelin Hangar

In the presence of executives of the Goodyear-Zeppelin Corp., Mayor G. Lloyd Weil and other city officials, the first piles of the $3,000,000 hangar, to be built at Akron's municipal airport, were driven Nov. 14 at eleven o'clock A. M. P. W. Litchfield, president of the corporation, turned the first earth and Mayor Weil then scooped out another shovelful. The hangar is expected to be completed within seven months.

The Akron Chamber of Commerce deeded to the Goodyear Zeppelin Corp. a tract of 103 acres of land free of all encumbrances, and gave to the corporation a 25-year right to purchase land around the hangar site.

Ohio

The Textile Rubber Co. has just completed moving its plant from Akron to Medina, O., the new quarters giving about six times the floor space formerly occupied. This addition, together with the installation of new equipment, considerably increases production. The principal products of the company are handle bar grips, hard rubber wheels with soft tires, small molded tires of all descriptions, electric sweeper parts, hard rubber rods for the rayon manufacturers and spools for the textile mills. C. H. Kellow is vice president and general manager; H. E. Springer, superintendent of production; and R. A. Cameron is in charge of sales.

The American Tire & Rubber Corp. has been formed to take over the American Rubber & Tire Co., Akron, O., which went through receivership recently. Floyd C. Synder is president and treasurer; E. L. Schmock, vice president; and Ray C. Myers, secretary. The original company was organized in 1911 and there have been several attempts to refinance during the past few years.

P. W. Litchfield, president of the Goodyear Tire & Rubber Co. and the Goodyear Zeppelin Co., has been elected a director of the National Aviation Corp. of New York. The corporation sponsors the promotion of all types of aviation.

J. A. Rishel has joined the Miller Rubber Co., Akron, O., as manager of footwear sales. He was formerly in charge of shoe sales for The B. F. Goodrich Co., prior to which he was assistant sales manager of the Mishawaka Woolen & Rubber Mfg. Co.

The Wooster Rubber Co., Wooster, O., is erecting a new building in which will be installed the most up-to-date equipment for turning out balloons in large quantities. The company expects to be located in the plant during the month of January.

The Goodyear Tire & Rubber Co., Akron, O., has commenced work on two new non-rigid lighter-than-air ships which will be sister ships to the Puritan, though slightly larger. The new ships will be 128 feet long, 37 feet in diameter and will have gas capacities of 86,000 cubic feet each. One will be quartered at Wingfoot Lake and the other will go to Los Angeles. The new ship kept in Akron will be used for training the personnel of the Goodyear aeronautics department and in making demonstration and passenger flights from Akron to other cities.

Harriss, Irby & Vose has opened new offices on the ground floor of the Ohio Bldg., 177 S. Main St., Akron, O.

The Akron Section of the American Society of Mechanical Engineers was host to the Cleveland Engineering Society on Nov. 27 at the Portage Hotel, Akron, O. The subjects discussed were "Development of Liberia for Rubber Growing by Firestone Tire & Rubber Co.," and "Dirigibles by Goodyear Tire & Rubber Co."

Charles J. Roese succeeds H. A. Flannery as division superintendent of the Goodyear Tire & Rubber Co.'s plant No. 2 at Akron, O.

Barr Company's New Home

To replace the plant destroyed by fire in September, The Barr Rubber Products Co., Sandusky, O., has secured floor space of over two acres devoted to the manufacture of toy balloons, hollow rubber balls and rubber toys. New

New Factory of the Barr Rubber Products Co., Sandusky, O.

new, larger and better quarters in which production will be started on Jan. 1, 1929. The new plant has a equipment will increase the manufacturing facilities and enable the company to produce the highest grade of goods.

Manager Rubber Service Department National Aniline

Harry Hine Replogle, of Cleveland, O., considered one of the best informed men in the rubber chemicals trade, has spent over a third of a century gaining knowledge of the compounding needs of rubber manufacturers. Born in Akron, O., March 20, 1877, he graduated from the public schools there in 1894. In the following

Blank-Stoller, Inc.

H. H. Replogle

year he began to learn rubber from the ground up in the works of the Diamond Rubber Co., Akron, quickly advancing to the post of a department manager, which he held until 1906. From 1906 to 1914 he was sales manager of general rubber goods for the Canadian Consolidated Rubber Co. at Montreal. For a while he owned and operated the Akron-Marathon Rubber Co. at Omaha, Neb. Disposing of this interest to the Marathon Rubber Co., Inc., of New York, he became sales manager at the home office of the Marathon Rubber Co., Cuyahoga Falls, O., remaining there from 1914 to 1918.

The National Aniline & Chemical Co. next secured Mr. Replogle as manager of its intermediates department in New York, 1918-1923. After spending a short time as sales and operating head in winding up the Wamesit Chemical Co., Lowell, Mass., he was engaged in 1923, by the Grasselli Chemical Co. as sales manager of its accelerators and rubber service department with headquarters in Cleveland; and this position he still retains with much credit to himself and his company.

Mr. Replogle is a member of Akron Lodge, No. 83, F. & A. M. His address is 1300 Guardian Bldg., Cleveland, O.

Why L. A. Lost "Zep" Plant

President Paul W. Litchfield of the Goodyear-Zeppelin Corp. of Akron, in a letter received by President Bonelli of the Los Angeles City Council, confirms the report that Akron has been practically decided upon as the most available location for the proposed $2,500,000 plant at which will be built the huge dirigibles lately ordered by the federal government. Mr. Bonelli and Chamber of Commerce officials had recently called upon Mr. Litchfield and other Goodyear officials to urge the advantages of Los Angeles. Mr. Litchfield said that he regretted that the Southwest could not be favored at this time, and he stated that while the Mines Field layout and climatic conditions had made a strong appeal, it would not be prudent to invest a large sum for a factory and hangar while the city held the field only on a lease (10 years with a 3-year buying option). He suggested purchase of the field with a 50 per cent addition to afford a site satisfactory for any large aeronautical enterprise.

New India Head Forceful and Original

W. G. Klauss, new president of the India Tire & Rubber Co. of Akron, O., is an executive of varied experience, exceptionally energetic and efficient, and has the rare knack of readily adapting himself to new, unfamiliar tasks and invariably registering success. He is convinced that, while products and processes may differ in various lines, there are certain fundamentals in all industries which, if clearly perceived and resolutely followed, should assure favorable results in almost any commercial venture. When he became president of a large match company, he had to learn the business, yet he soon placed his concern in the forefront. He has taken on in addition the presidency of a great tire company, is now studying tire making, and all who know the quality of his generalship are sure that he will soon place this concern among the few who dominate its line.

Mr. Klauss was born in Pittsburgh, Pa., Nov. 25, 1878, and was educated first in the city grammar schools and later with private instruction. His first business experience was gained during four years spent with sheet metal manufacturers; four years were next spent with Atwood & McCaffrey, Pittsburgh, rising from timekeeper to general superintendent; twelve years were spent with the Best Mfg. Co., in the same city, finally becoming general manager; and twelve years more were passed with the Johns-Mansville Co., Mr. Klaus passing from the post of manager for the thirteen Southwest states to general sales manager and assistant to the chairman of the board. Next, in 1926, he became president of the Federal Match Co. of Chicago, a position which he still holds.

Mr. Klauss belongs to all Masonic branches and many clubs and societies. Mr. and Mrs. Klauss have one son, married, and two daughters, who are at school. The couple have made their home at 814 Lincoln St., Evanston, Ill., but plan to move soon to Akron.

¶ *The article on organic accelerators on page 55 treats the subject in a comprehensive and helpful manner for the benefit of those confused by the multiplicity of such materials now available.*

Rubber Reclaimer Who Is Expert in Figures

Robert J. Houston, secretary and treasurer of the Akron Rubber Reclaiming Co., Barberton, O., was born in Wadsworth, Medina County, O., April 2, 1891. He spent his boyhood on a farm and distinguished himself especially in mathematics in the Wadsworth primary and high schools. After graduating he taught

Robert J. Houston

school about three years. Still of a calculating disposition, in 1912 he became an accountant with the Goodyear Tire & Rubber Co. in Akron, took several correspondence courses in reckoning lines, and then studied higher mathematics for a year in Buchtel College.

After serving as a special accountant with the *Akron Cultivator* and The B. F. Goodrich Co., Mr. Houston did accounting for seven years with the Babcock & Wilcox Boiler Co., Barberton, became an accountant on his own account, and was later with Chandler, Murray & Chilton, public accountants. In June, 1926, rubber again attracted him and he became assistant to the secretary-treasurer of the big Akron reclaiming company, and on March 15, 1928, secretary-treasurer, succeeding W. A. Hart, who occupies a similar position with the new subsidiary, Midwest Rubber Reclaiming Co., E. St. Louis, Mo.

Mr. Houston is a Mason, a member of the Barberton Lions' Club, fond of athletics, is married and also has a young son. His address is 187 College St., Wadsworth, O.

Chamber of Commerce Holds Annual Meeting

On Nov. 21 the Chamber of Commerce of Akron, O., held its annual meeting when the recent triumph of the Goodyear-Zeppelin corporation and the acquisition by Akron of the great dirigible base were the subjects of special comment. The speakers of the evening were James D. Tew, president of The B. F. Goodrich Co.; Harvey S. Firestone, president of the Firestone Tire & Rubber Co.; F. A. Seiberling, head of the Seiberling Tire & Rubber Co.; and P. W. Litchfield, president of the Goodyear company.

New Jersey

Late fall finds the New Jersey rubber industry fairly prosperous in all branches. The tire and tube business has remained firm during the summer and in some instances it has increased. Production of mechanical rubber goods is keeping up very well. The hard rubber situation remains about the same and the demand for rubber tiling is good.

The Rubber Mfgrs. Association of New Jersey will hold its annual meeting at the Stacy-Trent Hotel, Trenton, N. J., in December when officers will be elected for the coming year.

The Joseph Stokes Rubber Co., Trenton, N. J., hard rubber manufacturer, states that business is good in all departments. The company recently completed a new machinery storage building.

The Murray Rubber Co., Trenton, N. J., announces the appointment of H. A. Louderback as service manager to succeed C. A. Scollard, who resigned. L. L. Davidson has been appointed representative to look after the company's territory in South Carolina. The company reports that business is good in the tire, tube and mechanical departments. Orders have greatly increased for the new De Luxe 24,000 mile tires. It is reported that a large order for tires has been received from the United States Department Stores for the company's stores in and around Chicago.

The Semple Rubber Co., Trenton, N. J., has disposed of its plant to the Capital Coat & Linen Co., for $30,000. The rubber company closed down some time ago.

Bruce Bedford, president of the Luzerne Rubber Co., Trenton, N. J., and Mrs. Bedford, have returned from a pleasure trip to Columbus, O.

D. Lane Powers, of the Eureka Tire Co., Trenton, N. J., was recently elected to the New Jersey State Assembly on the Republican ticket.

Ralph H. Upson has joined the Aeromarine-Klemm Corp., Keyport, N. J. Mr. Upson was for ten years associated with the Goodyear Tire & Rubber Co. as salesman of aeronautic supplies.

F. R. Lee, sales and advertising manager of the Thermoid Rubber Co., Trenton, N. J., is on an inspection trip in Europe.

Art H. Massey, general sales manager of the Combination Rubber Co., Trenton, N. J., has returned from a business trip through the West. He reports having placed some good sized orders for Viking tires.

The United Rubber Machinery Exchange, Newark, N. J., is erecting an additional building to accommodate increasing stock. Foundations have been laid and the warehouse will be completed in December.

Lambertville Rubber Co., Lambertville, N. J., recently purchased by S. Rosenberg & Co., Inc., of Boston, will be in operation the latter part of December. The new owners will eliminate a number of lines previously made and devote their energies to certain staple types of footwear. The company will use the sales force of the Rosenberg company instead of employing road salesmen.

Mr. and Mrs. Milton J. Liebstein of the United Rubber Machinery Exchange, Newark, N. J., have returned from a honeymoon tour throughout the West. Mrs. Liebstein was formerly Miss C. R. Scheir, secretary of the United Rubber Machinery Exchange.

L. Albert & Son, dealers in rubber machinery, maintain offices and warehouses in Trenton, N. J. and Akron, O., where complete stocks of rubber machinery are carried.

Additions to Texas Plants of Godfrey L. Cabot, Inc.

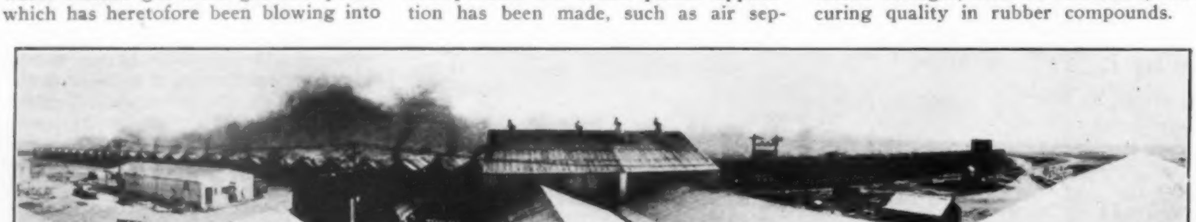
Carbon Gas Plant at Skellytown, Texas

An addition has just been started to the Skellytown, Texas, plant of Godfrey L. Cabot, Inc., which when completed will increase its production to about 62,000 pounds of carbon black daily. An addition under way to the Pampa plant will increase production in about a month to 60,000 pounds daily.

These two plants will burn only waste residue gas from gasoline plants which has heretofore been blowing into the air. All the gas used in the various plants of the Cabot company is produced as a by-product of the production of oil and gasoline and is purchased from the major oil companies.

The two new plants have been constructed almost entirely by electric welding and are driven by electric power. Many improvements have been incorporated for which patent application has been made, such as air separators, automatic presses, and cantilever table construction.

There is maintained at each of the Cabot plants a laboratory for controlling the quality of the production. The principal test is for variation in the volatile constituents and permits the immediate segregation of all black which fails to meet the standards for tensile strength, abrasive resistance, and curing quality in rubber compounds.



The Cabot Plant at Pampa, Texas

Eastern and Southern

The Consolidated Products Co., 15 Park Row, New York, N. Y., deals in complete machinery equipment for the rubber trade.

F. B. Keech & Co., 52 Broadway, New York, N. Y., announces the acquisition of H. T. Helm to its commodities department. Mr. Helm has been identified with the rubber business for about twenty years, not only in this country but in the Far East as well.

The Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y., has been forced to expand because of the increased demand for slitting and roll winding machines. Three new buildings, with a floor area of 15,000 square feet, have been added to the plant at a cost of over $100,000.

Keystone Brass & Rubber Co., 826 Arch St., Philadelphia, Pa., has leased two additional floors at 117 North Third St., increased business necessitating the expansion.

Virginia-Carolina Rubber Co., Richmond, Va., is arranging for sale of note and stock issues to meet the cost of the expansion program planned by the company. A mechanical rubber goods department will be established in addition to the present output of automobile tires, etc.

The Ault & Wiborg Co., Inc., 461 Eighth Ave., New York, N. Y., has discontinued the manufacture of dry colors for the rubber trade. The company's entire stock of rubber colors has been taken over by Vansul, Inc., 90 West St., New York, N. Y.

F. R. Henderson has announced the organization of Henderson Rubber Reports, Inc., to compile for public distribution complete statistical data of the rubber industry. The service is being established in response to a wide demand for some guide to the future trend of the rubber industry.

Jerome C. Hunsaker has been appointed vice president of the Goodyear Zeppelin Corp., Akron, O., with headquarters in New York City. Mr. Hunsaker was formerly assistant vice president of the Bell Telephone Laboratories, Inc.

The Society of Automotive Engineers will hold its annual dinner on Jan. 10, 1929, at the Waldorf-Astoria, New York, N. Y.

Proposed Rubberized Fabric Specifications

The Standards Committee of the Rubber Proofers Division of The Rubber Association of America, Inc., is collaborating with the Cotton Textile Institute, Inc., in an effort to formulate standard specifications for fabrics used in rubberizing and to standardize and clarify the terms and general trade practices involved in the sale and purchase of textiles.

The two organizations will endeavor to secure the cooperation of manufacturers of rubberized automatic fabrics, pyroxylin coated fabric makers and possibly cotton cloth converters so that the general requirements established will apply to all these groups.

Rubber Association Meeting

Heel and Sole Division

ONE of the largest attended meetings of the Rubber Heel and Sole Division of The Rubber Association of America was held in the Copley-Plaza Hotel, Boston, Nov. 15. In addition to the regular members of the division, a number of representatives of non-members of the association were present. The principal subject discussed was the warranty on black and tan composition soles.

The rubber composition sole manufacturers have always warranted their goods against defects in workmanship and materials, but they have been placing their own interpretation upon the warranty. This resulted in a situation where some manufacturers were not only replacing defective materials, but were also replacing shoes. This practice was reaching a point where it was getting out of control and the division decided to get back to first principles and therefore adopted the following warranty:

"The Blank Co. hereby warrants its soles and soling materials to be free from defects in workmanship and materials."

The interpretation placed upon this warranty limits the sole manufacturers to replacing materials only if, in the judgment of the sole manufacturer, the materials are defective. This is considered a long step in discontinuing a practice which was wrong in principle and was indefensible.

The new warranty will be placed on all acknowledgments of orders thus placing the shoe manufacturers and other purchasers of soles and soling materials on notice that the sole manufacturer limits his liability to replacement of defective material only.

The division also gave attention to the practices of marketing heel and sole seconds, protection against decline in price, changes in the forms for reporting statistics for inventory, production and shipments, standard practice for attaching composition soles, and other questions of interest.

National Tire Dealers Meet

The outstanding feature of the Ninth Annual Convention of the National Tire Dealers' Association held at Boston, Mass., Nov. 19-22, was the close approach to an agreement between the tire manufacturers and the tire retailers to cooperate more intimately in the future in handling merchandising problems in the industry. General Lincoln C. Andrews, director general of the Rubber Institute, who with Frederic C. Hood, of the Hood Rubber Co., were the chief speakers identified with the industry at the convention, asked that the N. T. D. A. appoint a committee to confer regularly with the Institute on matters pertaining to the sale of tires. The N. T. D. A. officials were quick to take advantage of this invitation and it is expected that three of the members of the board of directors located in the East, with Colonel H. V. Eva, president, as chairman, will comprise this committee.

From an attendance standpoint the Boston convention did not come up to expectations. The program was rich with interesting talks. The speakers in addition to Andrews and Hood included A. E. Feragen, of the Motor Wheel Corp.; Dr. Samuel W. Stratton, of the Massachusetts Institute of Technology; Harry G. Mook, and Rodger Babson, of the Babson Statistical Organization.

Colonel H. V. Eva was elected president for the third time. S. B. Harper was reelected first vice president; Thomas J. Lane succeeded A. M. O'Leary as second vice president; Tom Barbee was reelected secretary, and James M. Linnehan succeeded C. A. Dudney as treasurer.

Midwest

Cliff Myers, formerly Detroit representative of the Miller Rubber Co., has joined the Baldwin Rubber Co., Pontiac, Mich.

The Society of Automotive Engineers will hold its annual meeting, Jan. 15 to 18, 1929, at the Book-Cadillac Hotel, Detroit, Mich.

The Kansas City Rubber & Belting Co. (Kansas City Rubber Co.), 712 Delaware St., Kansas City, Mo., manufactures and distributes belting, hose, packing and mechanical rubber goods of every description.

St. Louis Sulphur Expands

At a recent meeting of the board of directors of the St. Louis Sulphur & Chemical Co., St. Louis, Mo., a large and immediate increase in plant facilities was decided upon. Contracts for this expansion have been let, to be taken care of by an increase in the capital stock, according to Alfred J. Heyer, president and general manager.

Mr. Heyer also announces that Wishnick-Tumpeer, Inc., has purchased an interest in the organization and R. I. Wishnick has been elected vice president and director of the company.

Pacific Coast

C. T. C. Tire & Rubber Co., Portland, Ore., after negotiations covering several months, has finally arranged to start manufacturing tires and tubes in the plant of the company which it succeeds, the Columbia Tire Corp., Columbia Blvd. and Mississippi Ave., according to President and General Manager J. F. Cullen, who spent much of November in the East buying additional equipment. It is stated that the new C. T. C. casing will have a heavier tread and carcass, using high grade amber friction stock and no reclaimed rubber in either tires or tubes. The latter will be laminated and steam-welded. Plans are being made for a minimum output of 300 tires daily with 125 employes, and an annual payroll of $300,000. The factory will have a capacity of 1,000 tires a day. President Cullen started with Goodyear when the latter was making but 100 tires daily, later he was with Kelly-Springfield and helped to design the latter's first cord tire, and in 1922 he was called to the Northwest to give expert aid to the old Columbia concern. He has obtained over a dozen patents, several of which will be used exclusively by the new concern. H. A. Ketterman is secretary and treasurer, as well as credit manager. He had much experience in that line with the Standard Oil and the Mack truck companies. C. W. Brown, general sales and sales promotion manager, has had 18 years' experience in selling tires on the Coast, having been with the old Continental, Firestone, and Kelly-Springfield. He was appointed as Portland branch manager for the latter in 1923.

Durable Mat Co., 2926 Sixteenth Ave., Seattle, Wash., which manufactures linked-section rubber mats, according to Secretary-Treasurer Charles T. Lyons, is finding its quarters too cramped to take care of the increasing business. The company, which began business in August, 1923, has a branch factory at 146 Superior St., Vancouver, B. C.; and Vice President H. W. Bell left on Nov. 16 for the Atlantic Coast for the purpose of establishing a factory to supply eastern and foreign demands. The report is denied that a factory will be built in the Southwest, as the Seattle plant can take care of all western demands. Owing to high freight rates a factory will, however, be set up in the Midwest section in the near future. The company states that its property is free and clear, and that it not only has no bonded or floating debt, but that it has always discounted all bills.

Huntington Rubber Mills, 1580 Macadam, corner of Nevada St., Portland, Ore., according to President Harry Huntington, is experiencing a good business in heels and soles, tire repair stocks, general mechanical rubber goods, automobile shock absorbers, and various patented specialties, and the outlook for 1929 is very promising.

Seiberling Rubber Co., Akron, O., through Vice President Charles W. Seiberling, denies a published report that the company plans to erect a $3,000,000 tire plant in Oakland, Calif., adjoining the proposed Chrysler automobile plant in that city; and also that President Frank A. Seiberling is negiotiating for a site for a plant on the Coast. The Seiberling company is, however, preparing for a considerable increase in its activities, according to Pacific Coast District Manager C. B. Reynolds, who was recently promoted from the management of the Portland branch, which latter is now in charge of Mark Ramsey, who had been in charge of the branch in Los Angeles. George Bellis succeeds Mr. Ramsey in Los Angeles, where the company plans to also have a factory branch within a short time and to make many changes in its marketing operations.

Pacific Mechanical Rubbermen's Golf Association has elected these officers for 1929: President, W. C. Hendrie; vice president, J. B. Lippincott; and secretary-treasurer, Walter Smith; committee, Milton S. Sprague, J. B. Lippincott, W. Art Corder, and George C. Spokesfield. At the recent eighth annual tournament on the California Golf Club links at San Francisco, presided over by Mr. Sprague aided by Mr. Lippincott, many trade leaders from Seattle to San Diego participated in contests for twenty fine prizes. The principal trophy, donated by the Seattle Brass Co., was won by K. E. Johnson after the play-off of a tie for low net with M. L. Van Scoten, both of the Pioneer Rubber Mills, followed closely by Tom Degen. Other players were: J. R. McKee, E. J. Nell, G. C. Spokesfield, H. R. Mansfield, E. H. Pierce, L. S. Cosgrove, E. H. Stevens, G. S. Lacy, H. G. Schulz, C. A. Wright, F. J. Shick, M. L. Springer, R. I. Lang, H. P. Martime, Henry Gabriels, S. L. Plant, G. J. Lee, H. E. Solje, Henry Thompson, and N. S. Dodge.

Gill Battery Co., manufacturer of hard rubber storage batteries, and of which M. R. Standish is president, has discontinued operations in San Bernardino and has started up a new plant in the Parker Bldg., East State St., Redlands, Calif. The new concern is headed by Volney Kincaid, a local banker.

NoPump Manufacturing Co., of Belvedere Gardens, represented by E. B. Spitzer, Room 508, Harris Bldg., Main and 11th St., Los Angeles, Calif., recently awarded a contract to the Pacific Goodrich Rubber Co. for 2,000,000 feet of heavy ½ inch rubber tubing to be used in making a tire-pressure equalizing device called the NoPump. The value of the order is said to be nearly $90,000.

Pacific Goodrich Rubber Co., Los Angeles, Calif., has found it necessary to make a radical change in its production schedule somewhat sooner than expected because of a rapid increase in demand for tires. Accordingly plans are being carried out as fast as possible for a 50 per cent increase in output. Much new machinery has been installed and a considerable amount is on the way, many workers are being hired daily, and it is confidently expected that within a very few weeks the daily production will be raised from the present average of 5,000 to 7,500. Vice President S. B. Robertson, who is in charge of the big plant, states that the benefit will accrue solely to local help and no additional personnel will be drafted from the parent plant in Akron. It is recalled that the building of the factory was started Aug. 16, 1927, and tire-making started in the finished plant just six months later. Forty salesmen representing the Los Angeles and Phoenix, Ariz., branches held a conference two weeks ago in the former city under the direction of General Sales Manager F. E. Titus and Los Angeles Branch Manager F. L. Hockensmith and the 1929 sales program outlined. Congratulations were extended to the Phoenix branch, managed by Russ Miller, for having won the president's cup for the highest sales total over its quota in a nation-wide contest for 1928. The conferees afterward enjoyed a trip through the factory and a dinner.

Goodyear Tire & Rubber Co., Los Angeles, Calif., on Nov. 9 turned out its 12,000,000th tire and a week later the Goodyear Textile Mills adjoining the tire plant had scored 40,000,000 pounds of tire fabric since the opening of the cotton factory in the summer of 1920. According to General Superintendent E. J. Thomas, the tire factory is operating on three shifts a day, and additions are being constantly made to the working force. Two large heaters are being installed, many more tire building machines are being added, and an extensive rearrangement of departments is being made and a more efficient layout is being planned in order to increase factory capacity. Expansion plans for 1929 will involve an outlay of about $300,000, the objective being a production of 12,500 tires a day, compared with a present average of some 10,000 a day. Up to Nov. 1 the factory had produced for 1928 a total of 2,231,736 tires, or 11 per cent more than the total for 1927, which also broke all previous records. The company, it is stated, is getting the bulk of its reclaim from the parent Goodyear plant in Akron, and it is said to be unlikely that a reclaiming unit will be set up in Los Angeles in the near future.

Goodyear staff changes include F. N. Thomas, recently in the sales department at the Los Angeles works, appointed to succeed E. C. Newbauer as Sacramento branch manager; and Jack Paullin, assistant branch manager in

Denver, to succeed Joseph Weiner as branch manager in Salt Lake City, Mr. Weiner having been transferred to Seattle. C. H. Williams, formerly of the sales force at Goodyear's in Akron, has been appointed assistant to General Sales Manager J. K. Hough in Los Angeles.

India Tire & Rubber Co., it is stated by Pacific Coast Manager W. R. Wheatley, of San Francisco, has thus far in 1928 broken all sales records in the Coast territory for a single year; and, while the distribution of tires and tubes throughout the whole area has been exceptionally good, that in the Southwest section has been outstanding. There the India representatives, Nelson & Price, Inc., expect to run over the $2,000,000 mark before the close of the year in and adjacent to Los Angeles.

United States Rubber Co. reports a gratifying increase in business throughout its entire Coast division during the past month, and a decided increase assured for 1928 over 1927. The advance is well distributed throughout the numerous lines handled by the company. J. B. Brady, of San Francisco, coast division manager, has returned from an annual conference in New York with the chief executives of the company. Last week he spent several days with Branch Manager J. B. Magee in Los Angeles, accompanied by H. A. Farr, coast manager of tires. Others who have been visiting the Southwest lately have been Coast Managers E. H. White, footwear, and L. B. Hutchings, clothing. E. L. Douglas, of Providence, R. I., has been spending the past few weeks studying the market on the entire Coast for druggists' sundries.

Dunlop Tire & Rubber Co. is giving greater attention than ever to the Pacific Coast territory, and the sales for 1928 will show a considerable gain over those of 1927, according to Coast Division Sales Manager R. R. Fox of San Francisco. New branches have just been opened in El Centro, Calif., and Phoenix, Ariz., by Branch Manager Earl V. Carlson, of Los Angeles, who has also moved into new and larger quarters at 1851 Industrial St.

Dayton Rubber Mfg. Co., Dayton, O., reports a substantial advance in value and volume of sales thus far in 1928 over the 1927 total in the Pacific Coast field, with the outlook very promising, according to Lynn Harvey, manager of sales at the factory in Dayton, and who has lately been making a Far West tour.

Eno Rubber Corp., Roy R. Musser, president, reports business as exceptionally good in oil field supplies, inflatable seat cushions and mattresses, tire repair material, specialties and general mechanical goods for the building trades. The factory at Torrance, Calif., is being largely remodeled and much new equipment is being installed. The city office quarters at 1726 S. Los Angeles St., Los Angeles, proving too cramped, the company has taken over a 2-story building at 110-114 E. 17th St., which is to be specially fitted up for offices, salesrooms, and for storage.

Pacific Goodrich Rubber Co., according to Philip X. Daniels, branch manager, moved last month into its new headquarters on South West St., Salt Lake City, Utah. The new building has 14,000 square feet of space, cost $45,000, and will supply Utah, Idaho, Montana, Wyoming and Nevada.

Samson Tire & Rubber Corp., Los Angeles, Calif., finds its main plant at Compton, Calif., severely overtaxed despite the fact that it has been repeatedly enlarged and its equipment greatly increased during the past few years, and notwithstanding the fact that it has for a long time been operated on three shifts a day. A similar condition prevails at the No. 2 factory of the company in San Diego, where the labor force is being steadily increased and the equipment augmented to meet the rapidly growing, nationwide sales. Already the latter plant is said to have gone well over the 15 per cent quota increase set for 1928. The success of the company is reflected in quotations on its stock, over double the figures of a year ago.

Firestone Tire & Rubber Co. of California will have its official opening very early in December, according to General Manager R. J. Cope, who has returned from Akron where he went recently with Vice President C. A. Myers, who has been supervising the erection of the new plant. The public reception had to be postponed until work on the grounds and the adjacent streets had been completed. Very little equipment remains to be added to the plant, and a considerable part of the machinery for the adjoining Xylos reclaiming plant has already been installed, so that this unit will probably be in operation within a month. Meanwhile tire production is being constantly speeded up to the corresponding relief of the parent Firestone plant in Akron which has been supplying the Coast. William H. Ryan has been appointed assistant to Los Angeles Branch Manager H. A. McKellar, succeeding G. McNeil, recently named as Seattle branch manager. An addition costing $30,000 is being made to the Firestone company's super-service garage at 800 E. 8th St., Los Angeles.

Pacific Goodrich's General Manager

An apt illustration of the advantage of an engineering training in enabling its possessor to pass readily from one line of work to another wholly different and make great success in each is afforded in the case of the versatile vice president and general manager of the Pacific Goodrich Rubber Co. of Los Angeles, Samuel B. Robertson, one of the most capable executives in the American rubber manufacturing industry. Getting things done in the most efficient and speediest manner possible is almost a passion with him; and hence was his talent for organization and execution quickly appreciated in the first work to which he applied himself—railroading.

Curtis Biltmore Studios L. A.

S. B. Robertson

Born at Milton, Mass., Mr. Robertson received his early education in the grammar schools of that city, and next took a thorough course in engineering at the Massachusetts Institute of Technology. Entering the service of the Pennsylvania Railroad Co., he rose rapidly from the position of division engineer to that of superintendent, and finally became general superintendent of the great transportation system. His work in providing service for large shippers brought him into frequent contact with officials of the big Goodrich plant at Akron, and, recognizing his exceptional qualifications, they induced him in 1919 to forsake railroading and to take up rubber engineering and factory planning. So well did he acquit himself in solving Goodrich works problems in Akron that the management soon intrusted to him also, all overhauling and new construction at the various Goodrich foreign plants.

From director of engineering with headquarters at Akron, Mr. Robertson was promoted in 1928 to the position of vice president and general manager of the new Goodrich plant on the West Coast. That he has once more made good in large scale operations is strikingly shown in the substantial success which has attended the extensive works in Los Angeles. Recently he brought his family from Akron and they have established their home at 514 S. Orange Grove Ave., South Pasadena. Genial, energetic, and appreciative, he enjoys the loyalty and heartiest cooperation of all his coworkers. Thoroughly wrapped up in his work, he has few outside interests and has practically no fads or hobbies.

Tire Price Revision

Leading manufacturers of automobile tires have announced reductions in prices ranging from 2½ to 7½ per cent on the popular sizes of first, second and third grades. The smaller companies are expected to follow suit.

Barthold De Mattia To Visit the Coast

Barthold De Mattia, vice president of the National Rubber Machinery Co., of which De Mattia Bros.' plant, Clifton, N. J., is a unit, left last month on a business trip to the Pacific Coast via the Panama Canal. The firm he represents is a well-known manufacturer of core chucks cores, molds and other tire building equipment. Mr. De Mattia will devote his time in visiting the entire rubber manufacturing trade on the Pacific Coast.

Suit Over Rubber Flooring

That rubber tiling had been so ill laid in its storeroom as to cause the tiling to curl, warp, and loosen, has been charged in a suit for $2,393.13 and for $300 attorney fees brought by the Wetherby-Kayser Shoe Co., fashionable footwear dealers, 715 S. Flower St., Los Angeles, Calif., against a firm of building contractors, an agency for rubber flooring, and a bonding company before Superior Judge Tapaan. The complaint alleges that the cement floor on which the tiling had been laid was of inferior quality, that it was not moisture-proof, and that the adhesive applied was faulty in quality and the rubber composition not up to specifications. A decision is expected early in December.

L. A. Rubber Imports

Crude rubber receipts at the port of Los Angeles are steadily increasing. One of the largest cargoes received at any Pacific port was delivered Nov. 7 by the Kerr Line motorship *Silver Fir*, almost 10,000 cases from Sumatra.

Canada's Footwear Exports Very Large

Canada may prove to be the world's largest exporter of rubber footwear in the year 1928. The United States led in 1927, with total exports amounting to 8,140,601 pairs of rubber footwear valued at $7,072,937, while Canada ranked second, having exported 6,670,048 pairs valued at $5,701,115. The 1927 total for the United States represented a decline of 4 per cent in volume, or 337,354 pairs, as compared with the year 1926, while on the other hand, Canada increased her exports by 39,985 pairs. For the first six months of 1928 Canada shows further large gains, while the United States apparently remains stationary. For this half year, the U. S. exports amounted to approximately 50 per cent of the entire year of 1927, while Canadian exports for the corresponding period amounted to 63 per cent of the entire year of 1927. This large increase in the Canadian trade of rubber footwear places Canada as leader during the first six months of 1928, exceeding the United States by 72,435 pairs. The excess is in the trade in canvas rubber-soled shoes, which during the 1928 period has amounted to 3,536,692 pairs.

Canada

Automobile tire price reductions ranging from 2½ to 8 per cent went into effect throughout the Dominion on Nov. 1. Other rubber goods are not affected. The reduction, which is made effective by all manufacturers, covers high pressure and balloon tires, but no reduction is made in truck or bus equipment, either pneumatic or solid. The reduction on balloon tires is uniformly 5 per cent. The same companies reduced prices of the same types of tires from 5 to 20 per cent on July 7, 1928. Any orders already placed for spring delivery will be protected against this decline.

Bookings are in order for spring delivery on garden lawn hose. Prices for next spring show a considerable reduction from the levels that prevailed this year. The situation in rubber footwear remains unchanged and prices seem likely to continue as they are until the end of the calendar year. Spring orders for tennis shoes are now being booked. Prices on these are down about 10 per cent as compared with last year.

Dunlop Tire & Rubber Goods Co., Ltd., recently celebrated the annual "Dunlop Night" at Columbus Hall, Toronto, Ont., which closed the out-door activities of the Dunlop Amateur Athletic Association. The distribution of service buttons which the company awards every fifth year of service starting at ten years, was the evening's feature. Members of the Dunlop industrial family to the number of 253 are now wearing long service badges, with a total of 3,707 years of service to their credit. Hon. E. B. Ryckman, K. C. M. P., president of the Dunlop company and John Westren, vice president and general manager, presented the 47 buttons to members who this year completed another five years' service with the company.

Seiberling Rubber Co. of Canada, Ltd. Fifty salesmen and branch managers who recently attended the second annual sales convention of this company were told by C. A. Jones, vice president and general manager, that sales had grown "from nothing to over two and a half million dollars" in slightly over a year. The advertising program for 1929 was presented by J. A. Thompson, advertising manager.

Ernest L. Kingsley

Ernest L. Kingsley, manager of the Canadian branch of the North British Rubber Co., Ltd., Toronto, Ont., recently passed away at the age of 63, following a two months' illness. Born in the United States he came to Toronto when nineteen and entered the business of his uncle, the late John D. King. After his uncle's retirement he established a connection with the North British company, and since that time had carried on its Toronto business.

J. S. McMurray, Gutta Percha & Rubber Ltd., Toronto, Ont., recently addressed the Canadian Export Club of Toronto. Mr. McMurray, who is a charter member of the club, is manager of his company's office in London, Eng., and recently completed a business trip through Africa, India, Burma, the Straits Settlements and Java.

A. D. Thornton, director of Dominion Rubber Co., Ltd., recently sponsored a movie film on "The Romance of Rubber" before the members of the Montreal Rotary Club at one of their recent weekly luncheons. The picture showed the plantation of the United States Rubber Co. in Sumatra.

Dominion Textile Co., Ltd. F. G. Daniels and J. H. Webb of Montreal who are managing director and secretary-treasurer of this firm have recently purchased the movable and immovable property of the Canadian Connecticut Cotton Mills, Ltd., Sherbrooke, Que., manufacturer of tire fabric. The amount involved in the sale of the immovable property including the company's investment in the Sherbrooke Housing Co., is $1,875,000. The value of the movables has not yet been set. This special meeting was presided over by H. L. Burrage, of Boston, president of Canadian Connecticut Cotton Mills Co., Ltd. The Sherbrooke plant is equipped with 38,000 spindles and has a weekly output of 120,000 pounds of cotton fabric.

Professor F. E. Lloyd, director of the Biological Bldg., McGill University, recently delivered a talk on rubber in the Far East and showed slides made from pictures taken by himself while engaged in rubber research work in Sumatra. He also showed a four reel film of the United States Rubber Co. rubber plantation in Sumatra.

Dominion Rubber Co., Ltd. (Manitoba). The six story building in Winnipeg was recently destroyed by fire with an estimated loss of $300,000.

Lt. Col. A. E. Massie, manager, Dominion Rubber Co., Ltd. (Maritime), is a patient at the St. John, N. B., hospital suffering from a serious illness.

T. B. Inkpen, formerly merchandise manager of the St. John, N. B., branch of the Dominion Rubber Co. Ltd., has taken over the management of the Halifax, N. S., branch succeeding F. L. Hunter, resigned.

Goodyear Tire & Rubber Co. of Canada, Ltd. Goodyear salesmen held two conferences lately. Eastern salesmen were guests of the company at Akron, O., where judges in the parade contest awarded first honors for the best unit to the Canadian delegation in its winter costumes of mittens and toques. Goodyear's western branch managers and salesmen attended a three day conference at Regina, Sask., a city that is rapidly becoming the automotive mecca of Western Canada.

Obituary

Noted Rubber Official and Philanthropist

Colonel Henry Aaron Guinzburg, former vice president and treasurer of the I. B. Kleinert Rubber Co., died Nov. 16 of heart disease at his home, 941 Park Ave. He was seventy-two years old.

He was born at Baltimore, Md., Apr. 11, 1856, the son of the Rev. Dr. Aaron Guinzburg, a noted rabbi and writer and

Underwood & Underwood

Col. H. A. Guinzburg

one of the founders of the Society for the Prevention of Cruelty to Animals. The family moved to Rochester, and later to Boston, Mass., and in the latter city the son was educated at the English High School. He then spent more than a year in Europe.

Colonel Guinzburg conducted a commission business in Boston until 1879, when he moved to St. Louis. In that city he became a railroad ticket broker and took an active part in civic affairs. He rose to power in the St. Louis Democratic organization and was offered the nomination for mayor of St. Louis, which he declined.

In 1898, he moved to New York and became an officer of the I. B. Kleinert Rubber Co., retiring two years ago after having been with the company for thirty years.

Always intensely interested in philanthropic work, especially among his own people, he devoted many hours each day to federation and other charitable work. He was treasurer of the Federation for the Support of Jewish Philanthropic Societies for the last eight years and led many fund raising campaigns for Jewish charities.

He was a member of Harmonie, Quaker Ridge, and National Democratic Clubs, and of the Tammany Society.

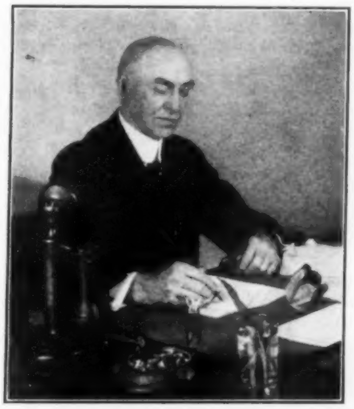
Surviving Colonel Guinzburg are his widow, Mrs. Leonie Kleinert Guinzburg; a son, Harold K.; a daughter, Mrs. James Marshall; a brother, Richard Guinzburg; and a sister, Lillie Guinzburg.

Funeral services were held on Nov. 18 at Temple Emanu-El, the Rev. Dr. H. G. Enelow of the temple and Dr. Solomon Lowenstein, executive director of the Federation for the Support of Jewish Philanthropic Socieities, conducting the obsequies. Cremation followed at the Fresh Pond Crematory, in Middle Village, Queens.

Well-Known Chemical Engineer and Inventor

Joseph Paul Devine, president of the J. P. Devine Mfg. Co., maker of chemical and general vacuum-drying apparatus, died on Oct. 28, at his home, 1372 Clinton St., Buffalo. He had just passed through a critical illness and was believed to be convalescent, when he suffered the relapse which proved fatal.

In the passing of Mr. Devine, the process industries and the rubber trade particularly lose one of its foremost figures. He was born in Philadelphia, Jan. 4, 1867, of Irish and Quaker ancestry. He was educated in Philadelphia and traveled extensively abroad. While on a European trip he made a special study of devices for extracting moisture, and secured the American license to manufacture the Passburg evaporating apparatus, which he soon introduced into numerous rubber and other works to their advantage. Among the earliest beneficiaries of the new low-pressure, curing system which he developed were the American rubber shoe makers, who were enabled to vulcanize shoes in two hours as compared with the former twelve hours' exposure. He was also largely instrumental in supplanting the old method of air-drying crude rubber with the more efficient vacuum process.



Joseph P. Devine

As a practical chemist, he did much to emphasize the importance of chemical engineering in numerous industries. He was one of the pioneers in effecting the deresination of low-grade rubbers and other gums on a commercial scale, and perfected several efficient devices for the recovery of rubber and other solvents. Other apparatus brought out by him effected the fractional distillation ot essential oils, and the rapid production of delicate pharmaceutical compounds.

Among the well-known products which his researches in vacuum-drying made possible are included Postum Cereal and G. Washington Coffee. The fumigation of cotton, furs, and fabrics was also developed by him for the federal government. While the late war was in progress he helped to establish plants for the recovery of potash in various states, and under his direction chemists were organized and plants installed for the production of dyes and intermediates on a large scale at a time when conditions abroad imperilled the industry. Mr. Devine also perfected an oil-heating system for high temperatures of great value in chemical trades.

In order to better serve his extensive domestic and foreign trade, Mr. Devine less than a year ago reorganized his company, giving it its present name and joining forces with the Mount Vernon Car Co.

Mr. Devine was the author of "Problems in Vacuum Drying," and was a member of the Rubber Association of America, Inc., the American Society of Mechanical Engineers, and the Japanese Society of America, and was the recipient of notable honors from many foreign governments. Ever genial and helpful, he had endeared himself to a host of friends.

Former General Manager Pennsylvania Rubber Co.

The death, which occurred on Nov. 13, of George Washington Daum, former vice president and general manager of the Pennsylvania Rubber Co., Jeannette, Pa., removes a well-known figure in the rubber industry, whose connection with the trade covered a period of twenty-seven years.

G. W. Daum

Born at Canton, O., on Feb. 22, 1885, Mr. Daum was appropriately given the name of George Washington. He was educated in the public schools and his first position was in the rubber department of the Whitman & Barnes Mfg. Co. at Akron, O. He continued his studies, however, and attended night courses in engineering, law and architectural drawing.

Mr. Daum's business associations also included employment with the Alden Rubber

Co., Barberton, and The B. F. Goodrich Rubber Co., Akron, and in 1909 he associated himself with the Pennsylvania Rubber Co. He began in the cost department of the latter company, became assistant superintendent, superintendent, production manager and in April, 1924, was made vice president and general manager, from which position he resigned in the spring of 1927.

A devotee of the game of golf, he belonged to various golf clubs and was a member of the B. P. O. E. and a 32nd degree Mason.

He is survived by his widow, Mrs. Carrie Orr Daum and a sister, Mrs. Arthur Stoner of Salem. Funeral services were held at the residence of his sister-in-law, Mrs. O. C. Barber, where he died, in Akron, O., with burial in Glendale cemetery.

Ernest A. Stephens

Ernest A. Stephens, advertising manager of the Dunlop Tire & Rubber Corp., Buffalo, N. Y., died Oct. 10 of pleurisy. Mr. Stephens had been in poor health for some time.

E. A. Stephens

A native of Dublin, Ireland, where he was born in 1873, Mr. Stephens joined the Dunlop company in England in 1890 and was made manager of the London office in 1894. He was afterwards made manager of the Clipper Tire Co., Coventry, Eng., a subsidiary of Dunlop, going from there to the Dublin branch of Dunlop. In 1912 his health began to fail and he came to America where he was associated for a number of years on the editorial staff of the Chilton Class publications. He rejoined Dunlop in 1920 at Buffalo, N. Y., remaining there until his death.

Mr. Stephens is survived by his widow and three daughters.

Lyman W. Evans

Lyman W. Evans, advertising manager of the Firestone Footwear Co., Boston, Mass., passed away the latter part of October after a brief illness.

Mr. Evans was born in Marlboro, Mass., Apr. 28, 1892, and had been assistant sales manager of the Apsley Rubber Co. before his connection with the Firestone company.

He was a member of the United Brethren Lodge, P. M. Royal Arch Chapter of Marlboro and Eastern Star, Hudson, Mass.

Dutch Rubber Propaganda

THE reports of the Propaganda Department of the International Association for Rubber and other Cultivations in the Netherlands Indies always make interesting reading and the fifth annual report just received is no exception.

The Propaganda Department, it may be remembered, together with the Rubber Growers' Association, participated in the Leipzig Spring Fair of this year and it has been decided to participate regularly. The department has succeeded in convincing the German rubber manufacturers of the importance of propaganda for rubber and are now assured of the regular cooperation of the Imperial Association of the German Rubber Industry. The department also took part in an exhibition organized by the Trade School for Shoemakers in The Hague, where propaganda for the crepe sole was carried on.

It is to be noted that more attention is being paid in Holland to this material for the purpose of soling shoes, the high cost of leather soles have to a great extent stimulated interest in this article. The question of preventing rubber soles from slipping on wet pavements is still receiving attention. It may be remembered that the department offered a prize for the best solution of the problem. At the time no satisfactory remedy was suggested and the matter was turned over to the Rubber Experiment Station at Buitenzorg. At the Government Gutta Percha Estate Tjipetir, it was attempted to prepare sole crepe from latex mixed with fine gutta percha flakes, but the results were negative as the gutta percha did not assimilate properly with the rubber.

Latex Preservative

Ammonia still continues to be used as a preservative for latex in spite of the various disadvantages attaching to its use. One of the most serious is that ammonia dissolves copper and that the copper in ammoniated latex may under certain circumstances lead to serious consequences. The case is recalled where the presence of copper in ammoniated latex used between the layers of fabric resulted in the spontaneous combustion of the fabric thus treated. Consequently latex has been repeatedly placed at the disposal of a big chemical concern with the object of finding a more suitable preservative.

Rubber Paving

The department has obtained permission from the Municipality of Rotterdam to lay a test piece of rubber paving in the Scheepstimmermanslaan of that city. After careful deliberation, it was decided to use the block made by the North British Rubber Co. of Edinburgh, with which excellent results have been obtained in Glasgow and Edinburgh. In consultation with the chief engineer for roads in Rotterdam, the stretch to be tested was selected with car tracks running through it, as a good connection of stone paving and car tracks is a problem that has yet to be solved. In Edinburgh, with the rubber paving there, a connection along the car tracks was obtained that after five years is still in splendid condition and it is hoped results in Rotterdam will be equally favorable.

Regarding the question as to whether over production of rubber could be eliminated by putting surplus rubber at the disposal of municipalities for the purpose of paving roads, the department states that under present circumstances, where the costs of rubber paving even with rubber free, are so prohibitive, this is not yet possible. If the life of a good rubber pavement were known and it could be shown that in the long run rubber paving was cheaper, that would alter conditions perhaps. But there is another problem. Rubber paving is something so new to almost all road engineers, and they know so little of its advantages that they would hardly undertake the high costs of rubber paving for their own account.

The purpose of the rubber test at Rotterdam is not so much to demonstrate that rubber pavement can be laid successfully, for this has already been shown in England and Scotland, but to enable the engineer on the Continent to observe rubber pavements at close quarters so that its outstanding merits may be proved. Once confidence has been gained in rubber paving the high costs will no doubt be considered a secondary question.

Planting Discontinued on British Malaya Estates

It is a generally accepted fact in Singapore that the estates in British Malaya have discontinued planting rubber except for squaring up corners. Reports to the effect that Malayan estates are planting bud-grafted rubber extensively are believed to be erroneous. Many Malayan planters are not convinced that bud-grafting is as much of a success as claimed, the impression being that bark renewal on bud-grafted trees is faulty, and that these trees are delicate and very susceptible to brown rust. It is admitted that tapping results the first two years are excellent, but it is claimed that after that period production rapidly decreases and amounts to even less than for ordinary trees.

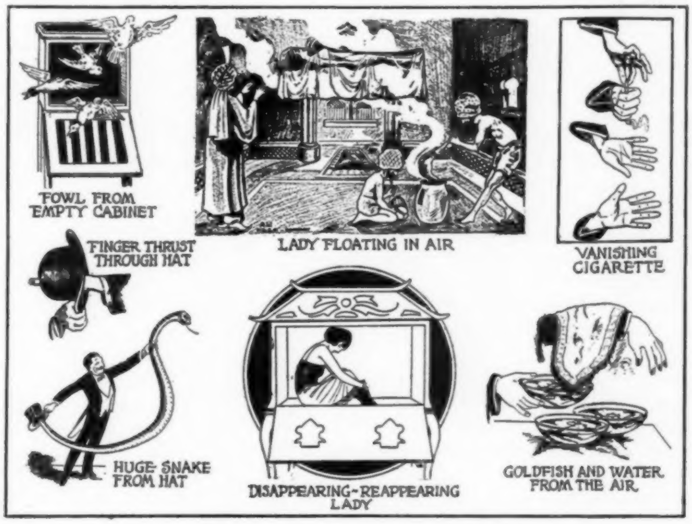
DURING THE FIRST NINE MONTHS OF 1928, Canadian exports of pneumatic casings numbered 1,214,128 as compared to 1,292,894 in the same period of 1927. Exports of inner tubes numbered 1,149,505 in the first nine months of 1928 as compared to 1,413,886 in the first nine months of 1927.

Rubber Devices for Stage Magic

Conjurers Employ Elastic Material in Many Ingenious Ways to Produce Mystifying Effects

THERE is a black art of rubber confounding, as well as compounding, but, unlike the latter, it has very little to do with chemists, mixers, and mills, and nothing whatever to do with wriggling handcuffed "escape artists" or other so-called rubber men. Its practice is confined to the illusionists of the stage who so blandly urge you to watch their every movement, knowing that the closer you watch the less you will see. Indeed, the most elastic of all materials, rubber, finds many curious, ingenious, and indispensable uses in modern magic, of which here are a few interesting examples of the most popular illusions.

A conjurer opens down the hinged side of a large wooden box, painted dull black inside, and set upon a topless table. He taps it inside with his wand to indicate its empty condition, passes the wand beneath the table, and closes the side. With some mumbo-jumbo talk as a preliminary, he then opens the side again, and, presto, out flies many ducks and pigeons. The trick is simple enough. The bottom of the box is hinged, and by touching a spring it swings up against the back, releasing into the box the fowl that had been tucked between the bottom and a large sheet of strong black gum rubber, the edges of which had been well fastened to the lower edges of the box. When the fowl leave the box the sheet rubber springs up and looks like a flat bottom. A fringe around the table had hidden the bulging rubber sheet.



Rubber Finds Many Indispensable Uses in Magic

Another clever use of sheeted black gum rubber occurs in the "disappearing-reappearing lady" trick. A cabinet, blackened inside and set upon a table, has a hinged door hanging down. A girl climbs into it and sits in a crouched position; and the side is turned up and fastened. The conjurer taps on the outside and then opens down the side. Apparently the cab.r.t is empty, and to confirm such impression the inside is rapped w.th the wand. The side is then hooked up, the cabinet is tapped on top, and the side again lowered. The girl is found sitting in her original position. The fact is that she never left the cabinet, but merely pushed herself against the rubber sheeted back and then hid behind a blind of thin black sheet rubber which she has drawn down in the middle of the cabinet. The tapping on the outside was her cue to let the rubber blind fly up and wriggle back to first posture.

In a dark, seemingly empty cabinet open on its front side a head or skull brightly illuminated with many tiny lights hidden at the sides can appear at command and answer questions. The "headless" body is concealed with mirrors set at an angle below the table, and the head appears when the operator causes a taut rubber curtain to fly up when the magician calls, "Appear!"

In Mid-Air Like Mahomet's Coffin

In levitation, or the raising and floating of a person in mid-air, some conjurers do not bother with the costly, elaborate apparatus that others regard as necessary but get a realistic illusion merely with short lengths of piano wire attached to a metal frame on the recumbent subject, attaching the wires above to airplane shock absorber cords hidden with drapery and passed over concealed pulleys by assistants. Trick hoops with spring-hinged sections can be passed around the floating body to "prove" that it has neither visible nor invisible means of support.

Another use for blackened rubber cord is for aerial dancers. When they come upon the stage an assistant thrusts his hand through a slit in a black drop curtain and hooks one of the heavy elastic cords to the "harness" on each dancer. Each dancer is then lifted and lowered from pulleys in the flies overhead, and she can cavort about in utter disregard of the law of gravitation.

A baffling trick is the production from "nowhere" of a bowl of water full of goldfish. The magician first shows both sides of a large foulard kerchief, and then throwing it partly over his left forearm he produces the little aquarium from beneath the foulard. All he really does is to extract the bowl with its 7-inch tightly fitting rubber cover from a hanger on his vest and deftly remove the rubber cover while turning up the bowl behind the foulard. Drinking glasses filled with water or other fluids are easily inverted, too, when capped with almost invisible rubber covers that snap snugly over the rims.

Rubber Fingers Seem to Pierce Hats

Sometimes a magician startles an onlooker by borrowing his derby hat and after thrusting his forefinger through it returns the bowler undamaged. With sleight of hand the magician merely sticks a hollow, pink, rubber half finger with a bit of conjurer's wax on the outside of the hat while holding the latter with his fingers outstretched inside. Some performers prefer a solid rubber finger with a pin on the end.

Removing snakes, eggs, bananas, sausages, etc., from an empty hat looks mysterious, but it is easy enough with practice when the articles are rolled-up hollow rubber forms with ends pierced to enable them to quickly regain their shapes as air enters them when released from the compression of wire springs within the hat. Most of such trick stuff is imported from Germany and England.

The vanishing cigarette puzzles many. It is made possible with a pull cord of the best quality of rubber threads covered with strong black silk. The cord is attached to the back of the operator's vest, passes down one of his coat sleeves, and is caught on a metal tube which is drawn down with the left hand into the palm of the right so that the cigarette may be palmed into it and then

whisked out of sight. With a larger and ventilated metal fake a canary can be palmed and made to vanish in the same way. When an egg must disappear a bell-shaped rubber sucker moistened with glycerine is attached to such a cord. A sucker, sometimes with a special hook, may also help to make a watch similarly vanish. Real eggs, billiard balls, and the like are palmed with a rubber sucker held to a finger with a loop of catgut, the operator merely swinging the article around to the back of his hand so that the front may be shown to be empty.

Rubber for Mind Readers and Mediums

Many mind readers use rubber tubing. The performer may be blindfolded, but, when he wears a large oriental turban concealing earpieces connected with rubber tubing passing back of his chair and under the stage to the darkened orchestra pit, he can easily get from a confederate using field glasses a good description of articles held up in the theatre, especially when a spotlight is moved over the audience.

Rubber tubing has been used by spirit mediums in many ways. In one case a mouth organ set in a vase was played upon by a man who was caught behind a screen blowing into a rubber tube. Another medium thus blew bubbles in a vessel of water to simulate the gurgling of a drowning person, while another used such tubing with air bulbs at either end, and laid under a rug, to send code signals in the dark to a confederate on the opposite side of a room to produce manifestations from spooks.

One of the most useful of a magician's accessories is the sheet rubber servante, a long, flat, deep pouch hidden on the back of a chair or an assistant. It can hold all sorts of trumpery for production or rejection, and even liquids can be safely emptied into it.

Where compressed air is available many inflatable rubber articles compressed within hats, cabinets, etc., can be quickly shaped to resemble skulls, dice, hams, liquor bottles, etc., the air being supplied through a rubber tube leading from behind a curtain, under a rug, and up through a hollow leg to the top of the magician's table.

A rubber pocket inside a magician's coat can be variously used. One performer who "materializes spirits" carries in such a pocket a lot of fine gauze treated with luminous paint which he dexterously floats about on a darkened stage, and with which he carries on a ventriloquial conversation.

A pink, soft rubber cache or handbox can be hidden in the palm of the hand and may hold a colored silk handerchief that is rolled up so small that it "disappears." A handerchief rolled into a tiny ball may be plucked from a knee or an elbow and easily shaken out if a triangular bit of rubber has been sewn into one corner.

From an assistant's mouth a hatful of eggs may be taken, one at a time, if the eggs are of hollow rubber with ends pierced to admit or expel air while being palmed in and out of the helper's mouth.

Then there is a rubber ball the size of a pea that a magician can put under any walnut shell he chooses and even beat the country circus gambler at his own game.

Foreign Trade Circulars.

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Number	Special Circulars
2115	Exports of Rubber and Balata Belting.
2124	Exports of Casings from Manufacturing Countries.
2129	Exports of Footwear from Manufacturing Countries.
2143	Comparative Footwear Exports from United States, Canada and United Kingdom during first nine months of 1928.

Car Upkeep Decreases

According to recent statistics the upkeep per car, during 1919, was $281 per year, of which tires were $82. In 1927 the upkeep amounted to only $229, with the cost of tires but $40, less than half that of eight years previously.

In addition, the tires in 1919 probably averaged but 5,000 miles, while the tires of 1927, at a much decreased cost, give more mileage than ever before.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

Number	Inquiry
1171	Manufacturers of rubber lined umbrella bags.
1172	White collars made of rubber or composition rubber.
1173	Data on Thiocol.
1174	Manufacturers of pilot balloons.
1175	Caoutchouc oil.
1176	Makers of rubber force cups.
1177	Continuous driers for reclaimed rubber.
1178	Manufacturers of mineral rubber desirous of representation in England.
1179	Rubber substance for coating the backs of mirrors.
1180	Manufacturer of soap solution for cleaning molds.
1181	Manufacturer of sugar wax.
1182	Rubber helmets for firemen.
1183	Tire splitter for use in the manufacture of reliners, blow-out patches, etc.
1184	Manufacturers of scalp applicators.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country	Purchase or Agency
34,132	Fire department supplies	San Juan, P. R.	Agency
34,155	Tires	Jullundar, India	Purchase
34,203	Erasers	Montevideo, Uruguay	Purchase
34,204	Splash-proof protectors for hosiery	Cardiff, Wales	Purchase
34,205	Tennis shoes	Plauen, Germany	Purchase
34,208	Erasers	Medan, Sumatra	Both
34,237	Toys and balloons	Bombay, India	Agency
34,289	Thread and elastic webbing	Santiago, Chile	Purchase
34,334	Footwear	London, England	Agency
34,335	Transmission belting	Helsingfors, Finland	Agency
34,395	Tires	Hong Kong, China	Agency
34,437	Aprons and bathing caps	London, England	Both
34,438	Tires	Tunis, Tunisia	Agency
34,442	Shoes and snowshoes	Munich, Germany	Agency
34,496	Scrap rubber	Hamburg, Germany	Agency
34,528	Druggists' sundries	Winnipeg, Canada	Agency
34,536	Rubber goods	Hong Kong, China	Agency
34,548	Boots and shoes	Constantinople, Turkey	Agency
34,557	Balloons	Lima, Peru	Agency
34,569	Gloves and spiral packings	Nishi-ku, Japan	Both
34,570	Elastic bands	Paris, France	Both
34,571	Sheeting	Santiago, Chile	Purchase
34,572	Automobile goods	Lahore, India	Agency

The End of Restriction

An Inquest

The termination of restriction on rubber exports was celebrated recently in the Rubber Exchange of London in a new song to an old tune, the words being as follows:

Who killed Restriction?
 We, said the Dutch,
 We made too much,
We killed Restriction.

Who saw him die?
 I, said Uncle Sam,
 Reclaimed used like jam,
I saw him die.

Who'll dig his grave?
 We, said the smugglers.
 We were the jugglers,
We'll dig his grave.

Who'll toll the bell?
 I, said Uncle Stanley,
 I must be manly,
I'll toll the bell.

Who feels it most?
 We, said the deputation,
 We lost our reputation,
We feel it most.

The refrain chanted at the end of each verse was a dolorous one:

All the dealers and the brokers
Tried to soothe their sore affliction
When they heard of the death of poor old Restriction.
When they heard of the death of poor old Restriction.

India Rubber Journal.

The Rubber Industry in Europe

Great Britain

Results of Restriction

With the termination of the Stevenson rubber restriction plan has come the opportunity for its adherents, while recapitulating the benefits it conferred, to have a last fling against the government for the clumsy way in which restriction was ended. A special article in the *Financial Times* endeavors to show just what restriction accomplished.

During the five years of restriction, the average export allowance was 67½ per cent of standard production, and it is claimed that this had the effect of keeping 500,000 tons of rubber off the market! That is to say, Malaya and Ceylon together restricted exports to the amount of about 100,000 tons per annum. Which sounds rather strange after all the fuss made about overassessments and excessive standard productions. If restriction really kept that amount of rubber off the market, [illegible] a rush of rubber the world should be flooded with by now!

However, there is consolation further along, which though not quite consistent with the foregoing statement about the half million tons of rubber kept off the market, has the advantage of offering a more cheering outlook. The paragraphs deal with estate accumulation and stocks in the hands of dealers in the East, which instead of increasing at the rate of 10,000 tons a month as the efficiency of restriction led everyone to believe, increased by only 9,000 tons in three months, as the following table shows:

	1928			
	June Tons	July Tons	August Tons	Sept. Tons
On estates over 100 acres	44,959	53,666	52,905	61,028
Dealers, Penang and Singapore.	18,207	18,663	18,972	14,898
Dealers (in restriction area).	13,560	9,055	12,147	9,683
Totals	76,726	81,384	84,023	85,609

At the same time, it is emphasized, visible stocks in London and America have been reduced by 28,500 tons, so that consumption seems to be in excess of production.

The chief reason for restriction, the article in question continues, was to maintain world supplies of raw rubber as near to probable requirements as posible, which is as good a way of putting it as any other. While consumption advanced by practically 50 per cent during the restriction period, production similarly increased, and proves how efficiently the restriction scheme fulfilled this primary purpose, it is pointed out.

To the average person it seemed that the chief purpose of restriction was not to help increase production, as one might be led to believe from this statement, but to restrict, so as to improve prices. Of course in another place the writer does say that restriction filled its purpose of maintaining the price and illustrates this by the following table of average prices:

Quarter Beginning	Per Cent Exportable	Average Price —Per Quarter— Shillings	Pence
November, 1922	60	1	2.285
February, 1923	60	1	2,858
May, 1923	65	1	2.242
August, 1923	60	1	2.294
November, 1923	60	1	2.175
February, 1924	60	1	0.917
May, 1924	60	0	10.974
August, 1924	55	1	2.632
November, 1924	50	1	5.998
February, 1925	55	1	7.356
May, 1925	65	3	2.469
August, 1925	75	3	7.269
November, 1925	85	3	10.709
February, 1926	100	2	4.013
May, 1926	100	1	9,001
August, 1926	100	1	8,199
November, 1926	80	1	7.265
February, 1927	70	1	7.696
May, 1927	60	1	6.165
August, 1927	60	1	4,620
November, 1927	60	1	7.053
February, 1928	60	1	0.438
May, 1928	60	0	9.150
August, 1928	60	0	8.75

Undoubtedly restriction had its uses but the above seems to demonstarte clearly enough that rather a strain is imposed on its warmest advocates to prove that it was a 100 per cent perfect remedy.

Institution of Rubber Industry

The Institution of the Rubber Industry Sales Section opened its new sessions with a meeting at the Blackfriars Theater, London, on Oct. 15. Charles Baster initiated a discussion on "Should Rubber Salesmen Possess Technical Knowledge?"

The London section of the Institution met on Nov. 5, at the Blackfriars Theater, London, to hear the first of two lectures of a popular character. The first was by Dr. J. J. Drakeley, head of the Department of Chemistry and Rubber Technology of the Northern Polytechnic.

Firestone Opens Factory at Brentford, England

The Firestone Tire & Rubber Co. (Great Britain), Ltd., opened its new factory, fronting the Great West Road at Brentford (Middlesex), Oct. 16, when a large number of guests were present to celebrate the event with the Firestone staff and representatives. Harvey S. Firestone, Jr., received the guests and conducted them around the establishment. Later on they were entertained at a luncheon and were addressed from across the Atlantic by Harvey S. Firestone, Sr., whose words were heard as distinctly as though spoken in the same room. The principal guest at the luncheon was Sir William Joyson-Hicks, Home Secretary and M. P. for Brentford Division.

Heads British Goodyear Plant at Wolverhampton

H. A. Flannery, who was recently announced by Vice President C. C. Slusser of the Goodyear Tire & Rubber Co., of Akron, as the general superintendent of the Goodyear plant at Wolverhampton, England, although one of the youngest of rubber executives, is conceded by those who know him best as exceptionally competent for that important post. He is

H. A. Flannery

particularly well versed in Goodyear methods and policies, having served with that concern solely since he left school. His rapid advancement well attests his capability. He will fill the place made vacant by the death of Thomas A. Linnane.

Mr. Flannery was born Apr. 3, 1894, in Horseheads, N. Y., and after preparation at the Addison, N. Y., high school, entered Cornell University from which he graduated in 1917 with the degree of A. B. In the same year he entered the service of the Goodyear company in Akron and was put in charge of inspections in the specifications department. In 1920 he joined the tire design division, becoming assistant manager. In Aug., 1927, he was appointed division superintendent of the tire division in Plant 2; and this was followed by his latest appointment, taking effect Nov. 1, 1928. He has since sailed for England.

Mr. Flannery is married, and, having few social affiliations, finds diversion chiefly in various athletic sports. He is known especially as a clever hand-ball player.

National Rubber Policy

There is a good deal of interest in the series of articles recently published on the subject of a national policy in the rubber industry. The first article stated that the first requirement was the provision of adequate statistical information in regard to the state of supply of raw product: stocks warehoused and afloat, and stocks in manufactures' mills. The underlying thought to be further developed in future

articles is the great need of cooperation among manufacturers and producers. The great habit of secrecy with regard to manufacturing processes is decried. Other factors requiring consideration, it will be shown, are the standardization of rubber goods, cooperative advertising and cooperative research. In connection with the latter, of course, the British Manufacturers' Research Association is attempting to do its best, and requires help in order to be able to function more efficiently. As is known, the Rubber Research Bill by which it is intended to give the required aid to the Research Association, has not fared very well in Parliament and there seems to be danger that it may be abandoned altogether. This would be a pity as its resources must be supplemented by the compulsory levy which the Research Bill provides if it is to render proper service to the British Rubber Industry.

Proposed Rubber Trust

In a letter to the *Financial Times*, Sir Frank Nelson, M. P., after discussing the possibility of a shortage of rubber in a few years' time—a possibility which has been mooted in more than one quarter—asks whether it is not time that the leading British financial interests should consider the formation of a trust corporation, the objects and reasons of which should be primarily to safeguard the British rubber industry from any danger of it passing into the control of America should lower prices still intervene, forcing shareholders to sell, not only their holdings but the estates as well to foreign interests.

Commenting editorially on the rubber outlook, the *Financial Times* says in regard to this suggestion:

"There would certainly seem to be both room and need for some such organization as that suggested by Sir Frank Nelson . . . a trust which could apply itself to investments in shares and possibly also the material in times of depression. The idea is well worth exploration.

Russia

The following official statistics regarding Russia's imports of crude and manufactured rubber during 1926 and 1927, show an increase in the arrivals of crude rubber, gutta percha and balata, but a considerable decrease in the imports of manufactured goods.

	1927	1926
Rubber crude, gutta percha, balata ....*tons*	10,959	7,264
Waste	4	.....
Thread ....*kilos*	9,883	105,466
Sheets and plaques........	1,601	.....
Solution	1,173	8,801
Soft rubber articles without other materials...........	3,823	.....
Soft rubber articles with other materials	8,738	7,590
Footwear	132	2,558
Belting	4,403	14,537
Hose	55,476	.....
Sheets with fabrics	1,027	23,603
Solid tires	19,650	4,463
Inner tubes	6,237	11,937
Tire covers	30,495	54,914
Conveyer belts............	381	.....
Hard rubber sheets, rods, tubes, etc.	1,551	3,277
Articles with other materials	365	595

Germany

Rubber Buffers

Much interest is displayed in Germany in the tests with the so-called rocket cars, which are moved along at great speed by the force resulting from the explosion of suitably arranged rockets. Some time ago, as was reported in these columns in the INDIA RUBBER WORLD, Opel had constructed a special car for the purpose which was equipped with rubber tires. So far it is not known how the results obtained compare with those previously achieved. The engineer Max Valier, who is to undertake a new test with a manned rocket car constructed wholly of metal, has found a unique use for inner tubes in his car. He uses an under inflated inner tube as shock absorber at the end of the axle by winding it four times around the axle board. It seems that this arrangement has been most successful in numerous tests. It was suggested to the engineer that he could have used one of the new types of rubber block bearings with better effect and without the risk he runs of having the tube burst. But these bearings and buffers are six to eight times as heavy as the para inner tube and since the weight of the car and of its parts must be kept as low as possible the tube must be given preference, and Valier plans to use these tubes for the same purpose also in future.

Acid and Alkali Resistance of Hard Rubber

The importance of acid-resisting hard rubber vessels in the chemical industry is of course well known. In a recent issue of the *Gummi-Zeitung* the degree of this resistance is demonstrated in a table compiled from a series of tests to show the reaction of hard rubber to various chemicals. In each case 100 gr. of the chemical was used and allowed to act on the hard rubber during eight weeks. At the end of this time the results were as follows:

Reagent	Weight after reaction Gr.	Change in weight
25% Sulphuric acid........	99.997	—0.003
Muriatic acid..............	99.986	—0.014
Muriatic acid, 6% +2% Brom.	99.387	—0.613
Muriatic acid, 15% +1% NaNO2	100.043	+0.043
Muriatic acid, 6% saturated with ferrous chloride.....	99.914	—0.086
Hydrofluoric acid, 6%......	101.620	+1.620
Sodium bisulphate, saturated	99.983	—0.017
Acetic acid, 30%..........	99.963	—0.037
Potash lye, 10%...........	99.990	—0.010
Ammonia, 10%	100.307	+0.307
Concentrated solution of common salt saturated with chlorine	100.301	+0.301

This acid-resisting hard rubber is also guaranteed to be able to withstand temperatures up to 70°, but consumers have found that much higher temperatures have no effect on it. The hard rubber is to be had in the form of massive plates, rods, tubes, disks, cocks and valves. For insulation purposes special hard rubber mixings are used.

Increased Tire Prices

It is learned that the firms belonging to the Association of German Rubber Tire Factories, namely: Continental of Hannover, Deka of Berlin, Dunlop of Hanau, Excelsior of Hannover, Fulda of Fulda, Metzeler of Munich, Peters Union of Frankfurt a. M., Phoenix of Harburg, and Vorwerk of Barmen, have revised their list prices for dealers and consumers of pneumatic tires for passenger cars, giant pneumatics, super-elastic solid rubber tires, so that from Oct. 1, 1928, prices will be 10 per cent higher.

Buffer Cushions

For unloading barrels and casks, the big beer breweries in Germany formerly employed cushions of rope. For some time rubber cushions filled with cork have been used instead. However, after about 18 months the filling is flattened out to such an extent that it has to be renewed. For this purpose the rubber cushions have an opening at the side through which the old filling can be removed and a new filling substituted. In spite of the fact that leather strips are used around the edges to prevent moisture from entering the cushions, they do become damp and cold. As a consequence, a big brewery in Dortmund has been experimenting with rubber cushions in which the filling is of sponge rubber enclosed in a rubberized fabric bag. Here the edges have been vulcanized together and the entrance of moisture is excluded. These cushions have now been in use for about one and a half years and have proved to be very satisfactory, retaining their elasticity and stability even under constant hard usage.

Rubber Slippers

Rubber has been used for tennis shoes, bathing shoes, and overshoes, but it does not appear to have found use in bedroom or house slippers, says the *Gummi-Zeitung*. This journal suggests that rubber slippers with linings of silk, wool or camel's hair would not only be warm but practical too, as spots could easily be removed. They certainly could be made in as attractive styles and colors as any of leather or fabric. These slippers could be used for traveling, too, and could then be supplied with suitable waterproof covers. Being of rubber they could easily be rolled up to occupy as little space as possible.

L-P-W. A. G. Not Exclusive Licensees Anode Co.

The Langbein-Pfanhauser-Werke A. G., Leipzig, Germany, is not the exclusive licensee for exploiting patents of the Anode Rubber Co. for the electric deposition of rubber. This firm has only the right to make installations for licensees of the Anode company.

The Rubber Industry in the Far East

Malaya

Rubber Exports

The quantity of rubber exported during the first half of the present year showed a decrease of over 26,500 tons or nearly 18½ per cent, while the value decreased by $87,000,000 or 41.7 per cent, it appears from an address made by the acting governor, Sir Hayes Marriott, on the colony's financial and general condition at a meeting of the Legislative Assembly.

The total declared value of rubber exported from British Malaya during the year ended July, 1928, was $378,199,000 on exports totaling 336,839 tons, against $590,969,000 on 404,247 tons for the previous year and $891,871,000 on 360,678 tons for the year ending July 31, 1926, and as compared with $141,203,818 on the export of 222,996 tons for the prerestriction year ending July 31, 1922.

The export duty has been twice reduced during the year, first on Jan. 1, 1928, when the duty was lowered from three cents per pound to 2 cents per pound, and again on July 1, 1928, when the duty was cut to one cent per pound.

Rubber Propaganda

At the same meeting the treasurer proposed a special grant of $34,826 towards propaganda work of the Rubber Growers' Association in respect of 1928. In advancing this provision, the treasurer said that in 1924 the Rubber Growers' Association prepared a comprehensive scheme of rubber propaganda which was to be spread over four years, and the council approved an annual contribution of $34,826 during that period. Last year a further grant of the same amount was approved. The Federated Malay States Government made a still larger contribution and is making a further one this year. At the end of 1927 the Rubber Growers' Association had a large credit balance in its propaganda fund; apart from the interest on its own investments, the income of the fund was derived solely from contributions made by the governments in the East. Nevertheless, the importance of propaganda to the rubber industry is felt to be a justification for continuing the grant for one year more. The motion was approved.

Rubber Research Institute

The Rubber Research Institute here is finding itself the subject of a good deal of rather unfriendly criticism. The trouble may be said to have started as a result of the off-hand manner in which Dr. Bryce, head of the Institute, dismissed the claims made by the South India rubber scientist, Herbert Ashplant, regarding the relation of latex tube bore and productivity. Mr. Ashplant is known as a serious worker who has done much for the South India rubber industry, and a section of the press as well as leading planters were rather surprised at the manner in which Dr. Bryce repudiated the serious claims of an experienced scientist. This summary dismissal of claims, which, if they should prove to be valid would be of the greatest importance to the rubber industry has turned the full light of criticism on Dr. Bryce and his staff.

Restriction End Regarded Passively

The end of restriction is being regarded with a good deal more of equanimity than might have been expected judging from what has appeared in the papers a little while back. While there are still a number of producers who regret restriction's removal, most of them are accepting things without much grumbling. Many are glad to be able to produce and export as they please and everyone seems to be settling down to the task of producing as cheaply as possible. While some pessimists predict the return of the dark days of 1921 and 1922 before restriction was enforced, most people seem to be more hopeful. And certainly the situation is far different from what it was immediately before restriction. At that time financial conditions all over the world were bad; business was slow and banks hard to approach on the subject of credits. Now most estates have had the opportunity of putting aside reserves, the problem of making the most of a restricted crop and producing at the most economic level, has prepared the average planter for the necessity of cutting down expense which is so pressing at the moment. And in fact, when reading over latest reports from rubber planting concerns, it is surprising to note how frequently one comes across the statement that the all-in costs are expected to be considerably lowered by next year. Some companies have stated that they expected to produce at an all-in cost of something like 6 pence to 7 pence per pound. An increasing number of companies has been attempting to meet the new conditions by amalgamation. One of the latest amalgamations is that of the St. Ives Rubber Co., Ltd., and the Amherst Estate (Selangor), Ltd.

On the whole, it may be said, that having expected a serious drop in rubber, and having become accustomed to low prices again, there are many who take the situation with more cheerfulness than might be expected. Of course the fact that most people seem to feel that the period of low prices can not endure for much longer and that an era of higher prices will soon be on its way again, may have something to do with the attitude of the average rubber grower. Meanwhile the usual number of suggestions for meeting the condition expected after the removal of restriction can be found in the daily paper. One of the most frequent suggestions one hears is that Sunday tapping should be cut out. At present all estates tap on Sunday too, and it is felt that a considerable reduction in output could easily be attained by the simple expedient of giving the tappers a day off on Sunday. The trouble, however, is that the average owner would not pay for seven days if coolies work only six, and the coolies do not desire to rest on Sunday or any other day if it means that a day's wages will be lost. They are not Christians and Sunday means nothing to them.

Rubber Stocks

It is officially stated that the result of the census of stocks of rubber within the restriction area as on Sept. 30, 1928, on rubber estates over 100 acres, and in the hands of dealers is as follows:

	Estates Over 100 Acres Tons	Dealers' Stocks Tons
Federated Malay States..	37,900	8,360
Straits Settlements......	5,920	658
Johore	12,118	499
Kedah	4,429	105
Kelantan	421	46
Trengganu	240	15
Totals..............	61,028	9,683

Indian Labor

A good deal of more or less acrid discussion has been called forth by the decision of the Indian Government to insist on a new wage standard for Tamil laborers on Malayan estates, which would raise the wages for male workers in certain sections to 51 cents, and to 41 cents for females, and there is quite a bit of talk about defying the Indian Government. As has been pointed out by responsible members of the planting community and also by a section of the local press, it is easy to talk about defying the Indian Government, but so long as Malayan planters intend to use Tamil labor they will have to submit to the demands of the Indian Government with as good a grace as they can muster, unless of course they prefer to employ the higher priced, more efficient, but less docile Chinese rubber workers.

The best that can be done, it is suggested, is to ask the Indian Government not to insist on the increase until the affairs of the rubber industry have shown a definite tendency to improve, as it is felt that the present is not a very opportune moment for the imposing of new burdens on the already sorely tried rubber industry.

Netherlands East Indies

Planting Statistics

The Department of Agriculture, Industry and Commerce, of the Netherlands East Indies, has just published a volume of detailed statistics regarding the planted area, output and exports of the most important crops.

With reference to hevea, 979 estates submitted details, against 922 the year before. Of these 979 estates, 535 are in Java and 444 are in the outer possessions (Sumatra, Borneo, etc.). Plantations of rubber in the Dutch colonies are not always devoted exclusively to hevea. In some parts, particularly in East Java, a large number of estates interplant coffee with the young rubber. In other parts blocks of tea or another crop are to be found side by side with more or less extensive areas of rubber which is the favorite practice in West Java. As a matter of fact, the habit of planting other crops besides rubber, whether interplanted as a catch crop as in the case of coffee, or on separate blocks on the same estate, is far more widespread in Java than in the outer possessions. Thus of the 979 estates listed, 479 planted hevea exclusively, and of the latter 317 were in the outer possessions (248 estates in Sumatra alone), and only 180 were in Java. Of the 298 estates that interplanted other crops with the rubber, there were 246 in Java, 39 in Sumatra and 13 in the other outer possessions. The usual combinations are rubber and tea, rubber and coffee, and to a lesser extent rubber and cocoa.

Areas and Outputs

The total area of the 979 estates reporting came to 1,565,021 hectares, 535 estates with a total area of 650,045 being in Java and 444 estates with a total area of 914,976 in the outer possessions. But only 37.6 per cent of the total area has been planted at all, the total area under rubber being 31 per cent. Expressed in hectares, the total area under hevea is 485,473, of which 210,642 hectares are in Java and 274,831 are in the outer possessions (261,613 hectares in Sumatra alone), so that the estates, particularly in Sumatra, have considerable areas of reserve land at their disposal. Properly speaking, the hevea industry is concentrated in three centers: East Java, West Java and Sumatra, and the most important is Sumatra. As compared with the year before, it is interesting to notice that there is a decrease in the total Java area. This was caused by the Government buying back private lands in the Buitenzorg district, and actually does not affect the rubber industry. The total area in the outer possessions increased from 844,724 hectares to the 914,976 hectares of 1927. However, the planted area both in Java and Sumatra showed increases, the increase in Java being over 15,000 hectares and in Sumatra and other outer possessions more than 27,000 hectares.

In the following table the details regarding the nature and immature areas in the Netherlands East Indies are given in hectares:

	Planted in						Planted Before		Mature
	1927	1926	1925	1924	1923	1922	1922	Total	Area
JAVA									
Bantam	2,087	1,569	539	461	444	240	6,636	11,976	6,619
Batavia	2,716	3,824	1,949	662	464	859	25,742	36,216	23,881
Preanger Regencies	8,459	4,337	4,343	2,482	2,122	1,580	32,296	55,619	29,688
Kediri	344	530	529	277	106	18	10,246	12,040	9,823
Pasoeroean	400	1,044	681	1,143	294	488	27,501	31,551	27,065
Besoeki	788	1,310	427	426	166	298	30,410	33,825	30,288
Other Java	3,045	2,180	1,433	1,309	727	653	20,058	29,415	17,714
Totals	17,839	14,794	9,901	6,760	4,323	4,136	152,889	210,642	145,078
SUMATRA									
Lampong Districts	1,724	909	500	901	246	180	8,085	12,545	8,864
East Coast Sumatra	16,186	12,014	8,693	7,805	4,596	4,848	144,135	199,277	145,097
Atjeh and Dependencies	3,113	2,554	1,062	925	419	55	14,324	22,452	14,183
Other Outer Possessions	5,111	2,630	2,107	1,353	1,199	2,877	26,280	40,557	26,097
Totals	26,134	18,107	12,362	10,984	6,460	7,960	192,824	274,831	194,241
Totals Dutch East Indies	43,973	32,901	22,263	17,744	10,783	12,096	345,713	485,473	339,319

The total output of estate rubber in 1927 came to 130,277 tons, of which 54,951 tons came from Java and 75,326 tons from Sumatra. Estimates of 1928 outputs place the total figure at 133,037 tons.

Native Rubber

Native rubber is usually associated only with Sumatra and Borneo, but it seems that in Java, too, the natives are paying more attention to hevea. Of course, native rubber plantations in Java will never be as important as those in Sumatra. In 1927 the planted area in Java owned by natives was 3,964 hectares, the mature part having an extent of 878 hectares.

No data are available regarding the acreage of rubber in the hands of natives in the outer possessions, and the figures for production even are estimated. For 1927 they have been placed at 144,013 tons, including moisture and dirt, and the dry equivalent is calculated at 95,471 tons.

It is reported that planting of rubber by natives has not stopped although the increases are naturally not at the same rate as in the previous years. Regarding 1928, it is interesting to note that the serious decrease in exports of native rubber that was expected as a result of the low prices for rubber did not take place. In certain sections of the outer possessions, where rubber is not the main crop and the natives have extensive rice fields and are interested in other crops, as coffee and coconuts, there was a marked decrease in outputs, but in Djambi, Riouw and East Coast Sumatra, where the population depends largely on the income from rubber for its subsistence, there was comparatively little difference in the amounts exported.

It is interesting to note further that the natives to a large extent seem to have found in rubber a crop peculiarly well suited to their habits of work, and that they have adapted themselves to the new conditions arising from the sharp drop in rubber with really remarkable readiness. It is therefore wise to continue to regard native rubber as a serious factor in the rubber market and to be prepared for continued serious competition from this source. This competition, it is expected, will assume a more acute form when the areas opened up in 1923 come into bearing, for it is precisely during that period that most new planting was done.

Regarding the exports from Djambi, a small drop is expected shortly, but this will not be due to lessened production but to the fact that authorities have issued new rulings regarding the condition in which rubber from this province is to be shipped. Thus the rubber blocks are not to be more than 3 cm. thick and are not to be transported floating on the water, as has been the case up to the present. These rulings aim at improving the quality of the native product in the province, which is notorious for the high percentage of dirt and moisture contained—as high as 50 per cent, it has been found.

Remilling Factories

There were in all 39 factories in the outer possessions that had obtained permission to engage in the business of remilling native rubber. The factories had a total number of 208 mills and an annual productive capacity of 46,649 metric tons in all. Of the number, 19, with 116 mills, operated in Borneo in 1927, producing 5,445,552 kilos of treated rubber out of a total 10,074,598 kilos. The total number of factories working in the outer possessions in December, 1927, was 27. At no time during the year were all the factories working, the highest average having been 30 during the months of July and November, respectively.

French Tire Exports

Exports of all kinds of rubber tires and tubes (solid and pneumatic for motor cars, motor cycles, and cycles) are included in one class in French export statistics, and the quantity is stated in gross weight in kilos (1 kilo = 2.2 pounds). The total exports during the first nine months of 1928 amounted to 17,069,500 kilos, as compared to 22,266,500 kilos in the first nine months of 1927. The number of automobile casings exported in the first nine months of 1928 is estimated at 1,331,410.

Rubber Patents, Trade Marks and Designs

Machinery Patents

United States

1,687,824. Lasting Machine. This invention relates to the lasting of shoes comprising rubberized or rubber parts and the device is applicable to either right or left shoes. V. H. Bodle and F. G. Francisco, both of Akron, O., assignors to the B. F. Goodrich Co., New York.

1,688,570. Vulcanizer Head. This invention refers to an improved head for use on horizontal vulcanizers in which the head is supported on a moveable carriage. It allows the head to be first unlocked or released, then moved out on the plane of the vulcanizer after which the carriage is moved transversely bringing the head out of alinement with the end of the vulcanizer to permit free access to its interior. H. L. Williams, assignor to the Williams Foundry & Machine Co., both of Akron.

1,688,632. Cement Coating Machine. This machine is adapted for coating inner soles with cement. The device consists in cooperating coating and feed rolls provided with means for the application of an even, relatively thick coating from a reservoir. T. B. Huestis, assignor to National India Rubber Co., both of Bristol, R. I.

1,689,133. Perforating Machine. This machine has particular utility in connection with the manufacture of rubber hose for removal of air trapped between the plies of fabric. J. I. Haase, assignor to the Goodyear Tire & Rubber Co., both of Akron, O.

1,689,845. Airbag Machine. This invention relates to a device for inserting airbags in tire casings preparatory to vulcanization. The bag is collapsed from one side toward the center which permits it to be inserted in the tire casing where it springs to place. G. F. Wikle, Milwaukee, Wis., assignor to the Fisk Rubber Co., Chicopee Falls, Mass.

1,689,990. Rubber Mixer. In a mixer of the inclosed type this invention provides a quick acting power operated door for the feed hopper. The device is actuated by a cock controlling air or hydraulic power. F. H. Banbury, assignor by mesne assignments to Farrell-Birmingham Co., Inc., both of Ansonia, Conn.

1,690,164. Tube Inspection Machine. This apparatus facilitates the inspection of inner tubes by immersing and passing them through a tank of water by an endless chain conveying device. J. R. Gammeter, Akron, O., assignor to the B. F. Goodrich Co., New York, N. Y.

1,690,171. Automatic Ball Classifier. This invention is adapted to sort or classify golf ball centers or cores in accordance with their deformability under a given pressure. W. D. Kmentt, Akron, O., assignor to the B. F. Goodrich Co., New York, N. Y.

1,690,625. Counterbalanced Tire Mold. The many objectionable operating features of the ordinary watch case tire vulcanizer are eliminated by this invention which employs counterbalancing means for assisting the movement of the swinging sections of the mold. Peter de Mattia, Passaic, N. J., assignor by mesne assignments to National Rubber Machinery Co., Akron, O.

1,687,565. Machine for Applying Adhesive Strips to Soles. C. Hunt, Lynn, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

1,687,598. Rotary Bias Cutter. C. W. Steele, assignor to the Miller Rubber Co., both of Akron, O.

1,687,607. Slitting Machine. A. E. Collins, Cuyahoga Falls, assignor to the Miller Rubber Co., Akron, both in O.

1,687,674. Tool for Loading Rubber Heel Blanks with Washers. V. R. Lawson, assignor to Lawson-Whitehead Co., both of Boston, Mass.

1,687,872. Inner Tube Machine. C. E. Maynard, Northampton, assignor to the Fisk Rubber Co., Chicopee Falls, both in Mass.

1,687,931. Heater Connection. W. E. Edgett, Indian Orchard, assignor to The Fisk Rubber Co., Chicopee Falls, both in Mass.

1,688,232. Molding Rubber Draining Boards. J. P. Harkin, Thornbury, Australia.

1,688,307. Separator. G. Gallie and B. D. Porritt, London, assignors to the Research Association of British Rubber & Tyre Manufacturers, Croydon, both in England.

1,689,831. Tire Building Machine. D. E. Hennessy, Milwaukee, Wis., assignor to the Fisk Rubber Co., Chicopee Falls, Mass.

1,690,615. Tire Vulcanizer. W. B. Burke, East Cleveland, O.

1,690,623. Collapsible Core. P. De Mattia, Passaic, N. J., assignor, by mesne assignments, to National Rubber Machinery Co., Akron, O.

Dominion of Canada

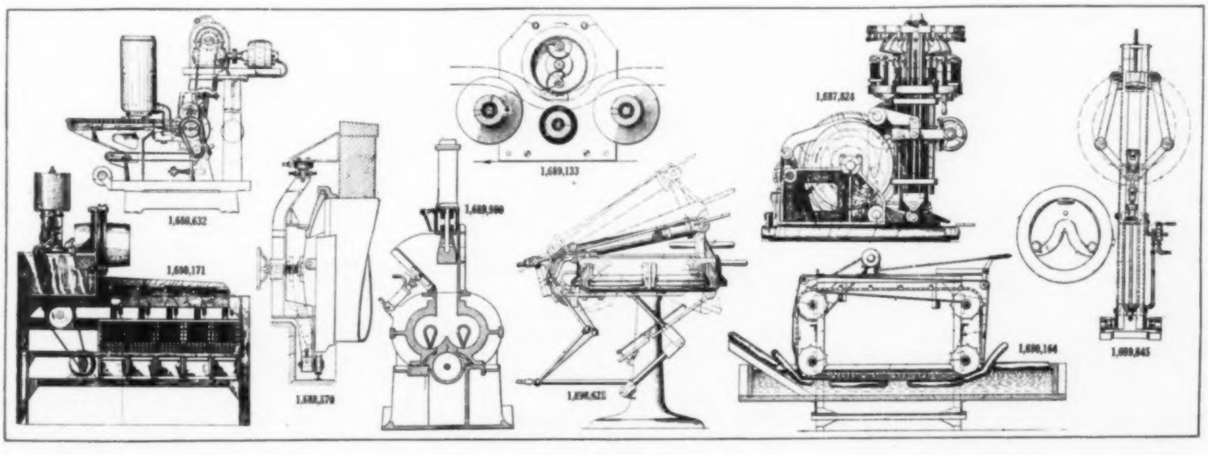
283,947. Tire Manufacturing Apparatus. The United States Rubber Co., New York, N. Y., U. S. A., assignee of W. L. Avery, Bishop's Stortford, Hertfordshire, England.

284,051. Rubber Coating Fabric Apparatus. The Dunlop Rubber Co., Ltd., Birmingham, assignee of C. Macbeth, Four Oaks, County of Warwick, and W. J. Dexter, Chorlton-cum-Hardy, Lancashire, all in England.

284,232. Hollow Article Mold. The Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of D. F. Twiss and E. A. Murphy, both of Birmingham, County of Warwick, all in England.

284,383. Die. The Dominion Rubber Co., Ltd., Montreal, Quebec, assignee of R. G. Anderson, New Haven, Conn., U. S. A.

284,384. Blank Cutting Machine. The Dominion Rubber Co., Ltd., Montreal, Que., assignee of R. G. Anderson, New Haven, Conn., U. S. A.



Rubber Patents, Trade Marks and Designs

284,399. Watch Case Heater. The General Tire & Rubber Co., assignee of H. A. Denmire, both of Akron, O., U. S. A.

United Kingdom

295,323.† Pile Fabric Vulcanizer. Oryx Fabrics Corp., 768 Frelinghuysen Ave., Newark, assignees of P. S. Smith, 37 Crescent Rd., Madison, both in N. J., U. S. A.

295,434. Rubber Grinder. C. E. Gardner, of W. Gardner & Sons (Gloucester), Bristol Rd., Gloucester.

295,435. Abrading Machine. C. E. Gardner, of W. Gardner & Sons (Gloucester), Bristol Rd., Gloucester.

296,193. Cutting-out Press. County Chemical Co., Ltd., Chemico Works, Bradford St., and B. J. Weldon, 354 New John St., West, both in Birmingham.

296,331.† Unpacking Rubber Strips. Goodyear Tire & Rubber Co., 1144 East Market St., Akron, assignees of R. S. Kirk, Mogadore, both in O., U. S. A.

296,381. Molding Plant. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, W. Willshaw and S. N. Goodhall, Fort Dunlop, Erdington, Birmingham.

296,454. Preventing Separation of Dispersions. Anode Rubber Co., Ltd., 15 Throgmorton Ave., London. (P. Klein, 90 Thököly-Ut and S. Gotleb, 29 Demlinsyki-Utca, both in Budapest, and A. Szegvári and G. F. Wilson, of the B. F. Goodrich Co., both in Akron, O., U. S. A.)

†Not yet accepted.

Germany

467,076. Spreading Machine. Albert Boecler, Paris. Represented by R. Specht, Hamburg.

Designs

1,045,861. Doubling Machine. Hermann Stickel, Georgenkirchstrasse 3, Berlin N. O. 43.

Process

United States

1,687,811. Tube Splicing. N. L. Warner, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,687,938. Producing Coils of Flexible Material. R. McC. Johnstone, Roselle Park, N. J., assignor to Cameron Machine Co., Brooklyn, N. Y.

1,687,945. Tire Building. M. A. Marquette, assignor to The Fisk Rubber Co., both of Chicopee Falls, Mass.

1,688,355. Preserving Products Formed of Rubber. T. M. Rector, Rutherford, N. J., assignor to Vitapack Corp., New York, N. Y.

1,688,869. Tire. H. M. Lambert, Portland, Ore., assignor to Lambert Tire & Rubber Co., Barberton, O.

1,689,312. Insulating Conductors. R. R. Williams, Roselle, N. J., assignor to Western Electric Co., Inc., New York, N. Y.

1,689,793. Tire Casing. T. Midgley, Hampden, assignor to The Fisk Rubber Co., Chicopee Falls, both in Mass.

1,690,114. Collecting Spray Dried Latices. R. Hopkinson, assignor to General Rubber Co., both of New York, N. Y.

1,690,115. Shoe Sole. T. B. Huestis, assignor to National India Rubber Co., both of Bristol, R. I.

1,690,240. Tire. T. Norcross, Erdington, England, assignor to Dunlop Tire & Rubber Corp. of America, Buffalo, N. Y.

1,690,514. Tire Tread Manufacture. H. A. Walter, Barberton, and J. R. Crossan, Wadsworth, both in O., assignors to Seiberling Rubber Co., a corp. of Delaware.

1,690,624. Tire. B. De Mattia, Clifton, N. J., assignor by mesne assignments, to National Rubber Machinery Co., Akron, O.

Dominion of Canada

284,245. Air Tube. The Hannon Tire & Rubber Co., Ltd., assignee of M. S. Hannon, both of Toronto, Ont.

284,435. Rubber Article Manufacture. The Veedip, Ltd., Brentford, County of Middlesex, assignee of S. D. Sutton, London, W. C. 1, both in England.

284,564. Rubber Article Manufacture. The Dominion Rubber Co., Ltd., Montreal, Que., assignee of E. Hazell, New York, N. Y., U. S. A.

United Kingdom

295,547. Elastic Fabric. H. Heltewig, 2 Diekerstrasse, Wichl, Barmen, Germany.

296,085.† Cable. General Cable Corp., 420 Lexington Ave., New York, assignees of F. M. Potter, Rome, both in N. Y., U. S. A.

†Not yet accepted.

Germany

466,700. Six-Section Balls. Dr. Istvan Dorogi, Dr. Lajos Dorogi and Dr. Dorogi & Co., Gummifabrik A. G., Buda-Pest. Represented by W. Fritze, Berlin, S. W. 61.

Chemical Patents

United States

1,687,861. Accelerator. Dimeta-Xylyl-Guanidine.—C. J. T. Cronshaw and W. J. S. Naunton, assignors to British Dyestuffs Corp., Ltd., all of Manchester, Eng.

1,688,491. Rubber Cork.—Raoul Grimoin-Sanson, Paris and Hermann Daniel, Argenteuil, France.

1,688,500. Plastic Composition.—Carl Kulas, Leipzig, Germany.

1,688,707. Accelerator. Process of making thiocarbanilid.—C. N. Hand and H. P. Roberts, Nitro, W. Va., assignors to the Rubber Service Laboratories Co., Akron, O.

1,688,755. Anti-Oxidant. Compound obtained by reacting guanidine and a hydroxy derivative of benzene. 1,688,756. Accelerator. P-di-methyl-amino-phenyl-p-phenetidyl guanidine. 1,688,757. Accelerator. P-di-methyl-amino-di-phenyl-guanidine. 1,688,758. Accelerator. P-di-methyl-amino-phenyl-o-tolyl-guanidine. All above patents granted to Winfield Scott, assignor to the Rubber Service Laboratories Co., both of Akron, O.

1,688,857. Composition. A lining composition for metallic vessels, comprising a mixture of rubber, benzol and aluminum soap in the respective proportions of 10, 100, and 5.—Takanoshin Domoto, Osaka, Japan.

1,689,008. Waterproof Coating. Rubber latex compounded with casein and a poisonous compound of arsenic.—Arthur Biddle, Trenton, N. J., assignor to United States Products Corp. of America, a corporation of Del.

1,689,570. Hard Rubber. Reinforced hard rubber is made by admixing comminuted hard rubber, disintegrated partially cured rubber, sulphur, fiber and rubber latex, drying, molding and vulcanizing.—W. B. Wescott, assignor to Rubber Latex Research Corp., both of Boston, Mass.

1,689,581. Stabilized Latex. The Stabilizer employed is blood proteid.—M. R. Day, assignor to Rubber Latex Research Corp., both of Boston, Mass.

1,689,628. Bonding Rubber to Metal. Vulcanizable rubber composition is bonded by vulcanization to metal with a film comprising sulphur chloride directly contacting the metal.—Harold Gray, Akron, O., assignor to the B. F. Goodrich Co., New York, N. Y.

1,690,051. Puncture Proof Composition.—E. Board, White Lake, S. D.

1,690,150. Latex Product. The process of thickening binders for plastic materials comprises producing a reaction between hemoglobin in solution and zinc oxide.—W. B. Wescott, assignor to Rubber Latex Research Corp., both of Boston, Mass.

1,690,166. Accelerator. A liquid solution of thio-carbanilide and a plurity of different amines.—Harold Gray, Akron, O., assignor to the B. F. Goodrich Co., New York, N. Y.

Dominion of Canada

283,915. Solution Processing Method. Removal of solvent from solutions of solid materials.—Dominion Rubber Co., Ltd., Montreal, assignee of W. S. Johnston and A. W. Keen, New York, N. Y.

283,927. Reclaiming Process. Separation of rubber from fabric by a solvent which is non-active on the fabric, and removing the rubber.—The Hercules Powder Co., Wilmington, Del., assignee of L. T. Smith, Kenvil, N. J., U. S. A.

284,014. Rubber Binder. A binding medium for colors, varnishes and cements comprises comminuted, devulcanized rubber scrap dissolved in hydrocarbon under pressure and heat.—Johann Tengler, Tagerwilen, Canton Thurgau, Switzerland.

284,093. Insect Lime. Rubber latex and a non-drying oily substance in aqueous dispersion.—The United Products Corp. of America, Philadelphia, Pa., assignee of Arthur Biddle, Trenton, N. J., U. S. A.

United Kingdom

295,387.† LEATHER SUBSTITUTES. Cotton is treated with aqueous dispersions of rubber.—Mechanical Rubber Co., Lisbon Rd., Cleveland, O., assignees of R. P. Rose and A. F. Owen, 1790 Broadway, New York, N. Y., U. S. A.

295,700. DIPPED ARTICLES.—Naugatuck Chemical Co., Naugatuck, Conn., assignee of E. Hazell, New York, N. Y.

296,107. RUBBER DEPOSITIONS. A continuous building-up process upon a temporary or permanent backing or mold. The process may be electrophoretic, chemical or mechanical.—Anode Rubber Co., Ltd., 15 Throgmorton Ave., London.

296,138. ELECTRODEPOSITION. In the electrodeposition of rubber from aqueous dispersions insulated screens are employed to regulate the uniformity of thickness of the deposit.—Anode Rubber Co., Ltd., 15 Throgmorton Ave., London.

296,372.† FOOTWEAR. Uppers, insoles and linings are connected together by vulcanizable rubber solution or latex.—J. W. Radburne, Rushden, Northamptonshire, assignee of Fresko Teknisk-Kemisk Fabrik, Akt., Gothersgade, Copenhagen.

296,395.† RUBBER. Powdered rubber scrap is mixed with latex or a rubber solution, the water or solvent evaporated in vacuo and the sheeted product used in the same way as new rubber.—Cogedex Compagnie General d'Exploitation, 2, Rue de Italiens, Paris, France.

296,398.† ANTI-OXIDANT. A reaction product of a diamine and a napthalene derivative.—Goodyear Tire & Rubber Co., assignees of A. M. Clifford, both of Akron, O.

296,451.† WATERPROOFED FABRICS. Fabrics containing yarns of thermoplastic cellulose derivatives are waterproofed with rubber solution.—British Celanese, Ltd., 8 Waterloo Place, London, assignees of C. Dreyfus and W. R. Blume, 15 East 26th St., New York, N. Y.

†Not yet accepted.

Germany

467,863. RUBBER MIXINGS FOR INSULATION. Oskar Fischer, Vienna. Represented by Dr. J. Oppenheimer, Berlin W. 15.

General

United States

October 16, 1928*

1,687,498. PRINTING BLOCK. C. Jack, Bern, Switzerland, assignor of one-fourth to United Piece Dye Works, a corp. of New Jersey.

1,687,684. HEEL. J. Nugent, San Jose, Calif.

1,687,736. HOCKEY STICK END BUFFER. W. E. Root, Palmerston, Ont., Canada.

1,687,761. TIRE WARNING SIGNAL. W. F. Hahn, Tampa, Fla.

1,687,912. INSULATED CONDUCTOR. E. B. Wheeler, assignor to Western Electric Co., Inc., both of New York, N. Y.

1,687,915. SHOE. J. E. Williams, Spring City, Pa.

1,688,116. HEEL. J. Celenko, Bedford, O.

* Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

Rubber Patents, Trade Marks and Designs

October 23, 1928*

1,688,322. TIRE. A. Alexander, New York, N. Y.

1,688,671. TIRE. W. A. Taylor, Detroit, Mich.

1,688,682. SPRING SHACKLE ANTI-RATTLE ATTACHMENT. H. E. Blomgren, Brooklyn, N. Y.

1,688,841. SPRING SHACKLE. J. F. Wallace, Shaker Heights, assignor to The Cleveland Pneumatic Tool Co., Cleveland, both in O.

1,689,000. GAITER. H. C. Wagner, assignor to The Beacon Falls Rubber Shoe Co., both of Beacon Falls, Conn.

1,689,119. CORD FABRIC. R. D. Evans, assignor to The Goodyear Tire & Rubber Co., both of Akron, O.

1,689,168. TIRE STRIP. F. S. Dickinson, New York, N. Y.

October 30, 1928*

1,689,398. SHOE INSOLE. F. P. Lioy, Passaic, N. J.

1,689,415. PAVING BLOCK. E. C. Wallace, Newton, Mass.

1,689,883. VEHICLE SUSPENSION. H. G. McComb, New York, N. Y., assignor to The Mechanical Rubber Co., Cleveland, O.

1,689,884. SHOCK ABSORBER. H. G. McComb, New York, N. Y., assignor to The Mechanical Rubber Co., Cleveland, O.

1,689,907. INNER TUBE. S. T. Allen, Los Angeles, Calif.

November 6, 1928*

1,690,134. ERASING DEVICE. M. A. Schmidt, Lyndhurst, N. J., and C. E. Wunderlich, Brooklyn, N. Y.

1,690,161. PACKING. W. W. Evans, Akron, O., assignor to The B. F. Goodrich Co., New York, N. Y.

1,690,162. VALVE. J. L. Fitzpatrick, Bowling Green, Ky.

1,690,327. TEAT CUP. L. Dinesen, Minneapolis, Minn.

1,690,365. HORSESHOE. R. E. Fruin, Chicago, Ill.

1,690,591. SOAP DISH. H. F. Nelthorpe, Los Angeles, Calif.

1,690,613. INNER TUBE. F. J. Austin, Hiawatha, Kans.

1,690,696. HEEL. H. G. Norwood, Baltimore, Md., assignor to A. D. T. Libby, Newark, N. J.

1,690,823. TIRE. F. R. Klaus and F. H. Meyer, Warren, O., assignors to The American Welding & Mfg. Co., a corp. of Ohio.

1,690,978. TOY MONOPLANE. L. Jatunn, Troy, Mont.

Dominion of Canada

October 9, 1928

283,851. STAIR TREAD. G. S. Frazier, Sebring, O., U. S. A.

October 16, 1928

283,966. TIRE GAGE. H. L. McPherson and J. H. Weatherford, co-inventors, both of Memphis, Tenn., U. S. A.

283,991. TIRE DEFLATION SIGNAL. H. R. Hughes, Kellogg, Idaho, U. S. A.

284,104. HOSPITAL PAD AND RING. M. Hart, Vancouver, British Columbia.

October 23, 1928

284,131. TOE BOARD PLATE. J. F. Duffy, Holland, Mich., U. S. A.

284,163. CLUTCH. B. Mauvillier, Casablanca, Morocco.

284,170. HAT COVER. P. Neubauer, White Plains, N. Y., U. S. A.

284,173. GASOLINE HOSE. J. M. Oden, Brooklyn, N. Y., U. S. A.

United Kingdom

October 3, 1928

295,187. HEEL PAD. V. Buckland, 8 Grand Ave., Hove, Sussex.

295,189. RUBBER BLOCK AND SLEEVE USED IN GRAMOPHONE. W. De Wrangel, 6 Rue Cavalotti, Paris, France.

295,190. STACK PIPE. W. Wyatt, The Kennels, Nutfield, Surrey.

295,199. LIFE SAVING SUIT. H. L. Beauvais and B. F. Taylor, 137 McGill St., Montreal, Canada.

295,215. TIRE ATTACHMENT. Dunlop Rubber Co., Ltd., 32 Osnaburgh St., London, and F. Fellowes, Fort Dunlop, Erdington, Birmingham.

295,339. BOBBIN. G. Spencer, 3 Lethbridge, Rd., and P. J. D. Hamilton, 64A, The Promenade, both in Southport, Lancashire.

295,382. JOINT MAKING PACKING. British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, assignes of P. T. Sywert, 31 Washington Ave., Scotia, N. Y., U. S. A.

295,414. VALVE HOLDER. A. Hall and Ferranti, Ltd., Eagle Works, Tame St., Stalybridge, Cheshire.

295,424. HEEL. G. S. Shaw, 24 Holland Rd., Wallasey, Cheshire.

295,489. CYCLE SADDLE. Powell & Hanmer, Ltd., and F. Hanmer, Chester St., Birmingham.

295,497. BALL. A. G. Nott, 18 Bank St., Melksham, Wiltshire.

October 10, 1928

295,541. MUDGUARD. A. Levy-Picard, 55 Pergolèse, Paris, France.

295,568. POWDER PUFF. B. A. Levitt, 91 Fort Washington Ave., New York, N. Y., U. S. A.

295,682.† SURGICAL TRUSS. F. J. Stuart, 1110 Locust St., St. Louis, Mo., U. S. A.

295,706.† MASSAGE ROLLER. P. Mayer, 57 Pernerstorfergasse, Vienna.

295,806. ANTI-RATTLING DEVICE. A. S. Cheston, 1 Mary Ann St., St. Paul's Square, Birmingham.

October 17, 1928

295,886. ELASTIC BANDAGE. J. Devane, 95 St. Stephens Green, Dublin, Ireland.

295,924. FLEXIBLE JOINT. A. S. Cheston, 1 Mary Ann St., St. Paul's Square, Birmingham, and W. Chinn, 94 Longford Rd., Chorlton-cum-Hardy, Manchester.

Rubber Patents, Trade Marks and Designs

296,152. MASSAGE ROLLER. W. A. E. Crombie, 1 Westwood Park, Forest Hill, London.

296,153. HEEL. H. Harmston, 48 Montpelier Rise, Golders Green, London.

October 24, 1928

296,185. RESILIENT DRIVES FOR MOTORCYCLES. H. Collier & Sons, Ltd., and H. A. Collier, 44 Plumstead Rd., Plumstead, London.

296,234. BULB HORN. E. G. Beken and A. E. Catchpole, 320 Witton Rd., Birmingham.

296,245. TEETH CLEANING APPLIANCES. E. Brill, 29 Unter den Linden, Berlin, Germany.

296,246. ARTIFICIAL LIMB. J. Loth, 28 Bergstrasse, Koslin, Pomerania, Germany.

296,264. BRUSH. H. Abrell and P. Trippell, both of 4 Dreikönigstrasse, Freiburg, Breisgau, and O. Abrell, Anselfingen, near Engen, Baden, all in Germany.

296,275. HAND STAMP. G. Landgraf, 4 Schuberstrasse, Leipsic, Germany.

296,329. TIRE. A. Ferretti and T. Laconi, 430 Broadway St., San Francisco, Calif., U. S. A.

296,350.† VETERINARY APPLIANCE. O. Lehmann, 52 Dufourstrasse, Bienne, Switzerland.

296,367.† SUCTION DENTURES. A. T. Gustafson, 3 Olof Wijksgatan, Gothenburg, Sweden.

296,370.† DOUCHE. J. Friedlander Gummiwarenfabrik Ges., 37 Weserstrasse, assignes of E. Sandig, 62 Lohmuhlenstrasse, both of Berlin, Germany.

296,524. SHAVING APPLIANCE. Hershman's Ltd., and I. Hershman, 1 Alba Gardens, Golders Green, London.

†Not yet accepted.

Germany

467,574. TUBE. Dr. Josef Talalay, Tempelhofer Ufer 18, Berlin S. W. 61.

467,583. TIRE WITH FABRIC INSERT. Asbest und-Gummiwerke, Aflred Calmon A. G., Hamburg.

Designs

1,045,816. RUBBER AND CARDBOARD. Krieger & Stunz, Gommern, Prov.

1,046,186. TYPEWRITER MAT. Liga Gummiwerke Hausener Obergasse 2, Frankfurt a.M.-Hausen.

1,046,279. SPONGE RUBBER INSERT FOR TUBES. Alice Knausz, Palisadenstrasse 17, Berlin, N. O. 18.

1,046,329. ADVERTISING LETTERS. Walter Goldeck, Fichtestrasse 22, Kiel.

1,046,354. RIM FOR MIRRORS. Hans Engel, Geisbergstrasse 23, Berlin W. 50.

1,046,521. GAITER. Martha Hirche, née Preische, Friedrichstrasse 235, Berlin S. W. 48.

1,046,555. TEETHING RING. Carl Plaat, Niehlerstrasse 312, Koln-Nippes.

1,046,902. BATHING SUIT. Rud. Möller & Co., Rosenstrasse 2, Chemnitz.

1,047,258. BABY PANTS. Gummiwarenfabrik, M. Steinberg, Koln-Lindenthal.

1,047,601. IMITATION FOODSTUFFS. Bruno Wornle, Haus Waldfried, Frankfurt a.M.-Niederrad.

1,047,610. BALL. August Widenhorn, Schlagerstrasse 21a., Hannover.

1,047,830. KNEE PROTECTOR. Alinda Vostry, née Reichardt, Homberg-Hochheide a. Rh.

1,047,853. DECOY ANIMALS. Vereinigte Gummiwaren-Fabriken Wimpassing vorm. Menier-J. N. Reithoffer, Wimpassing N-Oe. Represented by W. Zimmermann and E. Jourdan, Berlin S. W. 11.

1,048,533. RUBBER AND LEATHER SOLES, BELTING, etc. Oskar Hentschel, Chemnitzerstrasse 12, Dresden 24.

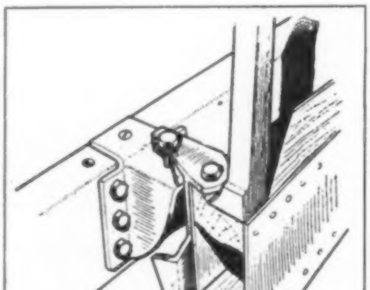
1,048,811. FAUCET REGULATORS. Rheinische Gummigesellchaft. W. Klotz & Co., Schutzenstrasse 64, Dusselhorf.

1,048,996. EXCHANGEABLE HEEL. Peter Kasthonig, Veronikastrasse 51, Essen.

Prints

United States

11,295. GOOD (WINGFOOT) YEAR MORE PEOPLE RIDE ON GOODYEAR TIRES THAN ON ANY OTHER KIND. Tires. The Goodyear Tire & Rubber Co., Inc., Akron, O. Published Aug. 1, 1928.



S. A. E. Bulletin.

A Rubber Pad Between Chassis Frame Brackets and Body Sill Cushions and Silences the Body.

Trade Marks

United States

Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section (1) (b) are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the later act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

October 16, 1928

Act of February 20, 1905

248,035. LEXIDE—sheet material made of fiber and rubber. United States Rubber Co., New York, N. Y.

248,050. Representation of a map of the United States and the words: "1,000 MILE TIRE AND TUBE REPAIR KIT" and "BOOT"—portable automobile tire and tube repair kits. Mohawk-Merrill Tire Co., Inc., St. Louis, Mo.

248,056. Representation of an arrow, above the representation the word: "ARCHEROID"; beneath the representation the words: "SPORT FABRIC"—treated textile fabrics. Archer Rubber Co., Milford, Mass.

248,146. RUBBERSAN—sponges. Waldemar Vernet, New York, N. Y.

248,245. Oval containing the representation of a female figure—bed and crib sheeting. J. C. Penney Co., Wilmington, Del., and New York, N. Y.

248,288. HURRICANE—composition roofing. H. H. Honigbaum, doing business as The Rubber Roofing Co., New York, N. Y.

248,298. TYRWELDER—tire vulcanizing machine. The Akron Tyrwelder Co., Akron, O.

October 23, 1905

Act of February 20, 1905

248,436. Fancy design—hose, packing and belting. Hamilton Rubber Mfg. Co., Trenton, N. J.

248,447. PLUS FOUR—golf balls. The Thomas Agency, Chicago, Ill.

248,516. SOMOS—elastic supporters, bandages and belts, etc. Etablissements Textiles de Pfetterhouse, Pfetterhouse, France.

October 30, 1928

Act of February 20, 1905

248,753. Fancy design containing the word: "BOBAL"—rubber and asbestos Mechanical packings and belts. United States Products Corp., Birmingham, Ala.

248,787. Fancy design containing the words: "CRES CORD"—rubber sheathed portable electric cord. Crescent Insulated Wire & Cable Co., Inc., Trenton, N. J.

Act of March 19, 1920

248,886. RUGBY—pneumatic tires and tubes. The Fisk Rubber Co., Chicopee Falls, Mass., and Cudahy, Wis.

248,892. NON-SLIP—flexible steel and rubber rulers. W. R. Mestler, doing business as The National Rule Co., Rochester, N. Y.

November 6, 1928

Act of February 20, 1905

248,910. Fanciful representation beneath which is the word: "DODO"—golf balls, clubs and bags. The Shield Co., Inc., Fort Worth, Tex.

248,917. LOCKED ARCH—boots, shoes and slippers of leather, rubber, canvas, textile, etc. Woodbury Shoe Mfg. Co., Derry, N. H.

248,918. RITEFORM SHOES—shoes of leather, rubber, etc. Louis Lowy, New York, N. Y.

248,925. GRAY STREAK—basketball shoes of rubber and canvas. The Draper-Maynard Co., Plymouth, N. H.

248,942. Representation of a girl's head, in the background a pennant with the words: "THE ANNA MATION"—boots, shoes and slippers of leather, rubber, etc. Woodbury Shoe Mfg. Co., Derry, N. H.

248,961. NO-MARK—footwear, soles, heels, overshoes, boots, etc. Endicott Johnson Corp., Endicott, N. Y.

248,989. ANNA MATION—boots, shoes and slippers of leather, rubber, etc. Woodbury Shoe Mfg. Co., Derry, N. H.

248,990. Pictorial representation of a garter enclosing the letters: "CHS"; above the representation the words: "THE DISTINCTIVE GARTER"—garters. C. H. Suckel, doing business as C. H. S. Garter Co., New York, N. Y.

249,036. THE CLARA BARTON SHOE—shoes of leather, rubber, rubber composition, etc. Shaft-Pierce Shoe Co., Faribault, Minn.

249,055. Representation of an arch beneath which are the words: "LOCKED ARCH"—boots, shoes and slippers of leather, rubber, etc. Woodbury Shoe Mfg. Co., Derry, N. H.

249,056. Representation of a locked arch —boots, shoes and slippers of leather, rubber, etc. Woodbury Shoe Mfg. Co., Derry, N. H.

249,074. "POSTURITE TO FOSTER YOUR POSTURE"—shoes of leather, rubber, etc. Dr. A. Posner Shoes, Inc., New York, N. Y.

249,112. METAL MASTER—hose for use with welding and cutting equipment. Purox Co., Denver, Colo.

249,174. PARA-TONE—shower curtain. Para Rubber Co., Newark, N. J.

Act of March 19, 1920

249,201. PARIS—dress shields. I. B. Kleinert Rubber Co., New York, N. Y.

249,205. STA-BRITE—liquid soap for rubber flooring, etc. Walter Marvin, doing business as Templar Oil Products Co., Brooklyn, N. Y.

249,207. CRYSTAL—nursing nipples and surgical gloves. The Pyramid Rubber Specialty Co., Ravenna, O.

249,224. HOWE—pneumatic tires and the inner tubes and outer casings thereof. Sterling Tire Corp., doing business as Hardwear Tire Corp., Rutherford, N. J.

Dominion of Canada

October 9, 1928

44,771. "RUFTUF"—overshoes, heels, boots, gloves, dress shields, etc. Canadian Goodrich Co., Ltd., Kitchener, Ont.

44,791. Letter "F" within a red shield-like device. Firestone Footwear Co., Hudson, Mass., U. S. A.

Rubber Patents, Trade Marks and Designs

October 30, 1928

44,914. "RUBBER-VAR"—semi liquid floor polish for rubber floors. Continental Chemical Corp. of Illinois, Watseka, Ill., U. S. A.

44,921. "POWERPLUS" — goods manufactured of rubber, rubber compositions or rubber substitutes. Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont.

United Kingdom

October 3, 1928

493,092. "RAPIER"—golf balls, etc. Donaldson Mfg. Co., Ltd., 1a, Blythswood Square, Glasgow, C. 2.

October 10, 1928

492,742. MAMMOTH—rubber, balata or gutta percha belting. Dick's Asbestos Co., Ltd., Cory Bldgs., 117, Fenchurch St., London, E. C. 3.

October 17, 1928

492,461. PLYTEX—soles and heels. Essex Rubber Co., Trenton, N. J., U. S. A.

492,758. "ERCOLITE" and "MADE IN ENGLAND"—boot and shoe soles and sheeting of rubber. Robert Brierly, Ltd., 24, St. Mary's Parsonage, Deansgate, Manchester.

October 24, 1928

491,769. Fancy representation containing the words: "VIKING" and "THE MINER RUBBER CO., LIMITED"—boots, shoes, slippers, leggings, gaiters, clogs and galoshes of rubber or leather. The Miner Rubber Co., Ltd., Denison Ave., Granby, Quebec, Canada.

492,013. CRESSONITE—blocks and tiles. Nederlandsche Gutta Percha Maatschappij, Anna Paulownastraat 95, Den Haag, Holland.

493,366. OXOPAD—heels and tips for boots and shoes. Redfern's Rubber Works, Ltd., Dawson and Springbank Sts., Hyde, near Manchester.

493,475. HARLEQUIN—erasers, etc. George Rowney & Co., Ltd., 10 and 11, Percy St., Tottenham Court Rd., London, W1.

Designs

United States

76,617. TIRE. Term 14 years. J. H. Kohsiek, assignor to The Firestone Tire & Rubber Co., both of Akron, O.

76,791. SHOE SOLE. Term 14 years. A. S. Funk and E. S. Bott, assignors to La Cross Rubber Mills Co., all of La Crosse, Wis.

76,799. GOLOSH. Term $3\frac{1}{2}$ years. W. B. Ihnen, New York, N. Y.

Dominion of Canada

8,067, 8,068, 8,069, 8,070. TIRE. Dominion Rubber Co., Ltd., Montreal, Que.

8,076. SOLE FOR BOOTS AND SHOES. Philips Rubber Soles, Ltd., London, Eng.

8,099. TIRE. Dominion Rubber Co., Ltd., Montreal, Que.

Leader in German-American Rubber Trade

To have been engaged over half a century in the rubber trade in Germany and the United States and to have won a host of warm friends and a high place in the industry of both countries, is the good fortune of William F. A. Schrader, treasurer of the Atlantic Rubber Manufacturing Co., New York.

Blank-Stoller, Inc.

William Schrader

Mr. Schrader was born July 5, 1861, at Harburg-Elbe, Germany, and was educated at the city high school, graduating in 1877.

After serving as an apprentice with Schulte & Schemmann, Hamburg, for four years, in 1881, he became a clerk for the rubber goods firm of Dr. Heinrich Traun-Soehne, Hamburg. Eight years later he was made manager of the firm's branch in New York. A year afterward with William Ehlers he formed the partnership of Schrader & Ehlers. At the same time he became treasurer of the Excelsior Rubber Works, the business of which was later taken over by the Traun Rubber Co., to be succeeded in turn in 1919 by the Atlantic Rubber Manufacturing Corp., Mr. Schrader continuing as treasurer.

William Schrader is a member of the Crescent Athletic Club, Brooklyn; a member of Schrader & Ehlers, importers, and sole distributers of the New York Hamburger Gummiwaaren Co., treasurer of the Atlantic company, as stated; and secretary-treasurer of the American Clay Pipe Works. His address is 239 Fourth Ave., New York.

Census of Manufactures, 1927

Rubber Belting, Hose and Tubing, and Packing

THE Department of Commerce announces that, according to data collected at the biennial census of manufactures taken in 1928, establishments engaged in the manufacture of rubber belting, rubber hose and tubing, and rubber packing reported the production, in 1927, of rubber belting valued at $22,106,760, a decrease of 5.9 per cent as compared with $23,481,072 reported for 1925, the last preceding census year; rubber hose and tubing valued at $37,368,594, an increase of 4.8 per cent as compared with $35,643,822 for 1925; and rubber packing valued at $4,632,043, an increase of 4.2 per cent as compared with $4,443,803 for 1925.

The following statement shows the production of rubber belting, hose, tubing, and packing, by kinds, quantities, and values, for 1927 and 1925. The figures for 1927 are preliminary and subject to such correction as may be found necessary after further examination of. the returns.

Rubber Belting	1927	1925	Per Cent of Increase or Decrease (—)
Total value	$22,106,760	$23,481.072	— 5.9
Transmissions:			
Number of establishments	19	23	.....
Pounds	23,261,320	*........	.....
Value	$12,674,242	$15,145,579	—16.3
Conveyer:			
Number of establishments	18	17	.....
Pounds	15,368,770	*........	.....
Value	$5,775,653	$5,868,238	— 1.6
All other:			
Number of establishments	9	8	.....
Pounds	3,866,369	*........	.....
Value (quantity reported)	$3,164,966	$2,467,255	48.2
(not reported)	$491,899		
Rubber Hose and Tubing:			
Total value	$37,368,594	$35,643,822	4.8
Garden:			
Number of establishments	20	20	.....
Feet	99,063,659	131,274,543	—24.5
Value	$7,635,252	$11,514,092	—33.7
Fire:			
Number of establishments	15	14	.....
Feet	14,032,924	10,835,829	29.5
Value	$5,720,549	$5,400,619	5.9
All other:			
Number of establishments	36	30	.....
Feet	242,712,762	*........	.....
Value (quantity reported)	$17,607,151	$18,729,111	28.2
(Not reported)	$6,405,642		
Rubber Packing			
Number of establishments	26	23	.....
Pounds	14,740,140	*........	.....
Value	$4,632,043	$4,443,803	4.2

*No data.

Rubber Tires and Inner Tubes

THE Department of Commerce announces that, according to data collected at the biennial census of manufactures taken in 1928, the total production of rubber tires and inner tubes in 1927 was valued $779,252,254, a decrease of 5.5 per cent as compared with $824,548,604 reported for 1925, the last preceding census year. The 1927 total includes $1,583,583 representing the value of rubber tires and tubes made as secondary products by establishments engaged primarily in the manufacture of other rubber goods. The numbers and values of the principal classes of products, for 1927 in comparison with 1925, are as follows: Casings for motor vehicles, exclusive of motorcycles—1927, 63,549,949, valued $633,582,246; 1925, 58,784,073, valued $656,491,733; increase in number, 8.1 per cent; decrease in value, 3.5 per cent. Inner tubes for motor vehicles, exclusive of motorcycles—1927, 70,855,455, valued $105,487,386; 1925, 77,387,836, valued $118,234,658; decrease in number, 8.4; decrease in value, 10.8 per cent. Casings and tubes for motorcycles and bicycles—1927, 2,801,260, valued $3,449,724; 1925, 2,511,661, valued $3,961,327; increase in number, 11.5 per cent; decrease in value, 12.9 per cent.

Of the 109 establishments reporting for 1927, 38 were located in Ohio, 10 in New Jersey, 10 in Pennsylvania, 7 in Indiana, 5 in Iowa, 4 each in California, Connecticut, Michigan, and Wisconsin, 3 in Maryland, 3 in Nebraska, 2 each in Colorado, Illinois, Massachusetts, New York, and North Carolina, and 1 each in Alabama, Georgia, Kentucky, Missouri, Texas, Virginia, and West Virginia. In 1925 the industry was represented by 126 establishments, the decrease to 109 in 1927 being the net result of a loss of 28 establishments and a gain of 11. Of the 28 establishments lost to the industry, 6 were idle throughout the year, 16 went out of business prior to 1927, and 6 reported commodities other than tires and tubes as principal products and were therefore transferred to the appropriate industries.

The statistics for 1927 and 1925 are presented in the following tables. The figures for 1927 are preliminary and subject to such correction as may be found necessary after further examination of the returns.

TABLE 1—SUMMARY FOR THE INDUSTRY: 1927 AND 1925

	1927	1925	Per Cent of Increase (+) or Decrease (—)
Number of establishments	109	126	—13.5
Wage earners (average number)*	78,256	81,640	— 4.1
Wages†	$120,063,854	$120,614,081	— 0.5
Cost of materials, factory supplies, fuel and purchased power, total†	$499,220,642	$559,940,978	—10.8
Materials and supplies	$488,167,931	‡	......
Fuel and power	$11,052,711	‡	......
Products, total value†	$869,688,063	$925,001,520	— 6.0
Tires and inner tubes	$777,668,671	$822,138,213	— 5.4
Other products	$92,019,392	$102,863,307	—10.5
Value added by manufacture§	$370,467,421	$365,060,542	+ 1.5
Horsepower	592,025	403,227	+46.8

*Not including salaried employes.

†The amount of manufacturers' profits cannot be calculated from the census figures, for the reason that no data are collected in regard to a number of items of expense, such as interest on investment, rent, depreciation, taxes, insurance and advertising.

‡Not reported separately.

§ Value of products less cost of materials, factory supplies, fuel and purchased power.

TABLE 2—RUBBER TIRES AND INNER TUBES—PRODUCTION BY KIND, QUANTITY AND VALUE 1927 AND 1925

	1927	1925	Per Cent of Increase or Decrease*
Rubber tires and inner tubes made in all rubber industries, aggregate value	$779,252,254	$824,548,604	— 5.5
Made in the tire and tube industry, value	$777,668,671	$822,138,213	— 5.4
Secondary products of other industries, value	$1.583.583	$2,410,391	—34.3
Pneumatic:			
Motor-vehicle, except motorcycle			
Casings			
Total number	63,549,949	58,784,073	+ 8.1
Total value	$633,582,246	$656,491,733	— 3.5
Balloon			
Number	32,786,832	*	......
Value	$326,062,731	*	......
High pressure			
Number	30,763,117	*	......
Value	$307,519.515	*	......
Inner tubes			
Total number	70,855,455	77,387,836	— 8.4
Total value	$105.487.386	$118,234,658	—10.8
Balloon			
Number	33.642.868	*	......
Value	$52.193.080	*	......
High pressure			
Number	37.212.587	*	......
Value	$53.294.306	*	......
Motorcycle and bicycle			
Casings and tubes			
Total number	2.801.260	2.511.661	+11.5
Total value	$3.449,724	$3.961.327	—12.9
Casings			
Number	434,712		
Value	$1,159.510	2,080.773	17.7
Single-tube tires		$3,564,933	— 9.1
Number	2,015,181		
Value	$2,079,770		
Inner tubes			
Number	351,367	430,888	—18.5
Value	$210,444	$396,394	—46.9
All other casings and tubes, value	$109.758	*	......
Solid and cushion			
Motor-vehicle			
Number	812,548	1,035,226	—21.5
Value	$34.985.419	$43,870,387	—20.3
All other, including carriage and other tiring, value	$1,637,721	$1,990,499	—17.7

*Not reported separately.

MARKET REVIEWS

Crude Rubber

New York Exchange

TRANSACTIONS on the Rubber Exchange from October 25 to November 24 inclusive were 10,903 lots, equivalent to 27,257.5 tons, compared with 16,730 tons done from September 24 to October 24 inclusive. This increase of practically 39 per cent marks the trade reaction to the discontinuance of the Stevenson plan of export restriction of crude rubber from British owned plantations.

Summarized by weekly periods the course of the market was as follows:

Trading during the week ended October 27 exhibited little interest in rubber futures and prices moved very narrowly. A general waiting attitude prevailed but the tone of the market was steady. Contracts sold amounted to 2,168.5 tons. Trading was very quiet owing to general lack of interest on the part of manufacturers. Spot-ribs on "A" contracts closed at 18.70 cents nominal. "BB" blanket crepe closed at 18.60 cents nominal. Transactions in "A" contract futures closed as follows: December 18.70 to 18.80 cents; January 18.50 cents; March, 18.60 cents; May, 18.80 cents; July, 18.90 cents; August and September 19.00 cents. The spreads between high and low were very narrow in all positions. Business during the week closed November 3 was very quiet. Dealers were waiting for news reports regarding shipping expectations from the Far Eastern markets. The removal of restriction on November 1 was already discounted and had no effect on the market. The interest in trading improved and brought the volume of dealings up to 4,952.5 tons or more than double that of the previous week. There was a slight upward movement of prices.

Spot ribs closed on November 3 at 18.80 cents nominal and "BB" blanket crepe closed at 18.20 cents nominal. Transactions on "A" contract futures closed as follows: December, 18.60 cents; January, 18.50 cents; March, 18.60 cents; May, 18.80 cents; July 19.10 cents; August, 19.00 cents; September, 19.20 cents.

During the week terminated November 10 a holiday intervened for national elections. The contracts sold were equivalent to 3,965 tons. The market was steady but rather dull due to lack of support by manufacturers who were waiting in expectation of lower prices when shipments from the plantations are in full swing.

The trade in futures was very limited. Spot ribs on "A" contracts closed at 18.20 cents nominal, and "BB" blanket crepe closed at 17.80 cents nominal. Transactions on "A" contract futures closed as follows: December, 18.10 cents; January, 18.10 cents; March, 18.30 cents; May, 18.40 cents; July, 18.60 cents; August and September futures were 18.70 cents.

Trading during the week ended November 17 included 3.556 contracts equivalent to 8,890 tons or more than double the tonnage of the previous week due in part to December liquidation. Prices showed some decline but forward positions were relatively steady.

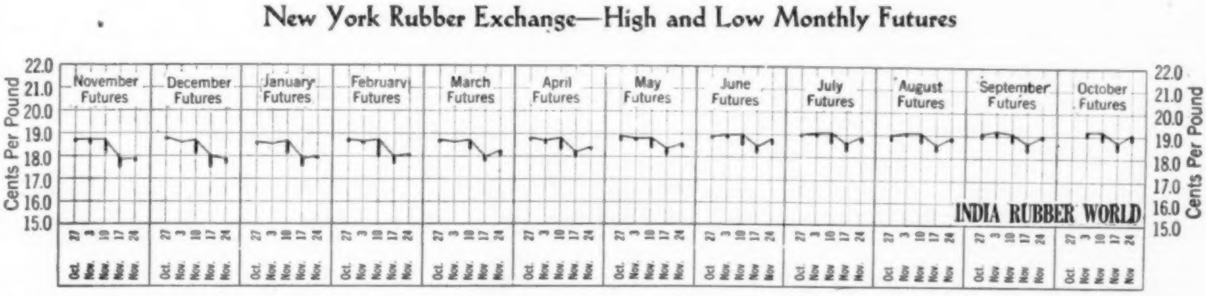
Spot ribs on "A" contracts closed at 17.80 cents, and "BB" blanket crepe closed at 16.70 cents nominal. Transactions on "A" contract futures closed as follows: December, 17.70 cents; January, 17.80 cents; March, 18.00 cents; May, 18.30 cents; July, 18.50 cents; August and September, 18.60 cents.

The week ended November 24 fell only slightly short of the week previous in volume of business transacted. Contracts to the number of 3,295 or 8,257.5 tons were sold. The market became steadier in tone and prices advanced over those of the previous week. Deliveries for seven months in the future reached a premium of one cent a pound.

Spot ribs on "A" contracts closed at 17.90 cents nominal, and "BB" blanket crepe closed at 16.80 cents nominal. "A" contract futures closed as follows: December, 17.80 cents; January, 17.90 cents; March, 18.10 cents; May, 18.60 cents; July, 18.90 cents; September, 19.00 cents.

According to W. S. Hammesfahr of the Rubber Exchange of New York the large shipments of rubber from the United Kingdom indicate that American manufacturers are in urgent need of rubber

New York Rubber Exchange—High and Low Monthly Futures



The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLOSING PRICES—CENTS PER POUND—"A" CONTRACTS

Positions	October						November																				
1928	25	26	27	29	30	31	1	2	3	5	6*	7	8	9	10	12	13	14	15	16	17	19	20	21	22	23	24
October	18.7	...	...	...	...	...	...	...	...	...	....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
November	18.7	18.7	18.6	18.6	18.5	18.5	18.6	18.6	18.7	18.7	....	18.6	18.5	18.4	18.1	17.9	17.8	17.8	17.6	17.5	17.7	17.7	17.8	17.8	1.79	...	...
December	18.7	18.7	18.7	18.6	18.6	18.6	18.6	18.6	18.6	18.7	....	18.6	18.5	18.4	18.1	18.0	18.0	17.8	17.6	17.5	17.7	17.7	17.8	17.8	17.9	17.9	17.8
1929																											
January	18.5	18.6	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.6	....	18.5	18.4	18.2	18.1	17.9	17.8	17.7	17.5	17.5	17.8	17.9	17.9	17.9	18.0	17.9	17.9
February	18.6	18.7	18.6	18.6	18.6	18.5	18.6	18.6	18.6	18.7	....	18.6	18.4	18.3	18.0	18.0	18.0	17.8	17.7	17.7	17.8	18.0	18.1	18.0	18.1	18.1	18.0
March	18.6	18.7	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.7	....	18.6	18.4	18.3	18.3	18.0	18.0	17.9	17.8	17.8	18.0	18.1	18.2	18.3	18.3	18.2	18.1
April	18.7	18.8	18.7	18.7	18.7	18.6	18.7	18.7	18.7	18.8	....	18.7	18.6	18.5	18.3	18.2	18.2	18.1	18.0	18.0	18.2	18.3	18.3	18.4	18.4	18.4	18.4
May	18.7	18.9	18.8	18.8	18.8	18.7	18.7	18.8	18.8	18.8	....	18.8	18.7	18.6	18.4	18.3	18.4	18.2	18.1	18.3	18.3	18.5	18.4	18.5	18.6	18.5	18.6
June	18.8	18.9	18.9	18.9	18.9	18.8	18.8	18.9	19.0	18.9	....	19.0	18.8	18.7	18.5	18.4	18.5	18.3	18.2	18.3	18.4	18.6	18.6	18.7	18.7	18.8	18.7
July	18.9	19.0	18.9	19.0	19.1	18.9	19.1	18.9	19.1	19.0	....	19.1	18.9	18.8	18.6	18.6	18.6	18.4	18.3	18.3	18.5	18.7	18.7	18.8	18.9	18.9	18.9
August	18.8	19.0	19.0	19.0	19.1	19.0	19.0	19.0	19.0	19.1	....	19.1	19.0	18.9	18.7	18.5	18.5	18.4	18.3	18.4	18.6	18.8	18.8	18.8	18.9	18.9	18.9
September	18.9	19.0	19.0	19.0	19.1	19.0	19.0	19.0	19.2	19.1	....	19.1	19.1	18.9	18.7	18.5	18.6	18.4	18.3	18.4	18.6	18.9	18.8	18.8	18.9	19.0	19.0
October	...	...	...	...	...	...	19.1	19.0	19.2	19.2	....	19.1	19.1	19.0	18.8	18.6	18.6	18.4	18.4	18.5	18.7	18.9	18.8	18.8	19.0	19.1	18.9

* Holiday.

for current requirements. He attaches little significance to the quantity of rubber reported shipped from British Malaya and Ceylon since the ending of British restriction and says:

In view of the long-expected movement of the so-called excess stocks in British Malaya and Ceylon, which were automatically released on November 1, the quantities shipped from there are neither surprising nor disproportionately large. However, the shipments from the Netherland East Indies are exceptionally heavy and since the Stevenson act never had any effect on these territories, except in such instances where plantations previous to last February voluntarily adhered to it, it appears that these large exports from this source occurring simultaneously with the large exports from Malaya and Ceylon are a coincidence, and will be offset by considerably smaller shipments during subsequent weeks. The most significant feature in the situation is the relatively large quantity shipped from the United Kingdom. Which is considered indicative of urgent need on the part of manufacturers for current requirements.

On November 7 the secretary of the Exchange announced that the members, by a vote of 154 to 61, have adopted a rule prohibiting the extension of credits to customers in excess of $1,000 effective from January 1, 1929. Any member violating this rule will be subject to suspension or expulsion.

The Clearing House of the Rubber Exchange has always required members to put up security in the form of cash original margins on all transactions and has required members to keep their contracts margined daily, but the exchange has never compelled members to exact such margins from their customers. The new rule, Sec. 38 A of the By-laws, will require all members to obtain market differences from their customers.

F. R. Henderson, president of the Rubber Exchange announced that he would make public for the first time statistical data covering many years of scientific research. This will be supplemented by reports covering the crude rubber market.

New York Outside Market

Consumers' interest in the purchase of crude rubber was as far from keen in November as it was in October. Manufacturers bought steadily for current needs only, and waited in expectation of lower prices. Their views in this respect are not shared by dealers. Importations for the past three months have run heavy, November receipts being estimated at about 70,000 tons. Those for December and January are also estimated at essentially that figure. Whatever congestion this influx of rubber may occasion it is not expected to continue after the first of the year. Stocks then may be restored to a liberal working margin preliminary to the heavy increase of consumption scheduled for 1929.

In regard to the probability of lower prices due to the absence of export restriction the fact should not be overlooked that current prices and conditions of credit, enable rubber growers, dealers and speculators to carry for a rise double the amount of rubber that they could handle one year ago when rubber was sold at 40 cents a pound.

The general features of the outside market by weekly periods were as follows:

The market for the week ended October 27 was extremely quiet because of the approach of the termination of restriction. Buyers also appeared to have sufficient rubber for their immediate requirements and preferred to await the market outcome. Prices, however, remained very steady and without sign of weakness. The foreign markets also were steady with but small fluctuations. Factories bid ineffectually for spot rubber at prices below the ideas of sellers.

Closing spot prices were: ribs 18¾ cents buyers, 18⅞ cents sellers; first latex 19⅝ cents buyers, 19¾ cents sellers; "B" blanket crepe at 18¼ cents buyers, 18⅜ cents sellers; "C" blanket crepe at 17¾ cents buyers, 18 cents sellers.

Paras stiffened a little and but few buyers were willing to pay the advance and dealers were not inclined to sell. Upriver was quoted at 20 cents buyers, 20¼ cents sellers. Balatas were absolutely flat with no demand for sheet. Block was firmly held at 43 cents.

The market of the week closed November 3, like that of the week before, was a waiting one on the part of consumers, dealers and traders alike. All were awaiting the effect of the influx of rubber liberated after November 1. Prices remained very steady and dealers, looking for post-election developments were loath to sell.

Closing spot prices were: ribs 18¾ cents buyers, 18⅞ cents sellers; first latex crepe 19⅜ cents buyers, 19½ cents sellers; "B" blanket crepe 18 cents buyers, 18¼ cents sellers; "C" blanket crepe 17⅝ cents buyers, 17¾ cents sellers.

Paras were very steady and although lower prices were talked it was very difficult to obtain rubber at the New York market prices which were, Upriver fine 20¼ cents buyers, 20½ cents sellers. Balatas were firmer in all grades on talk of European demand.

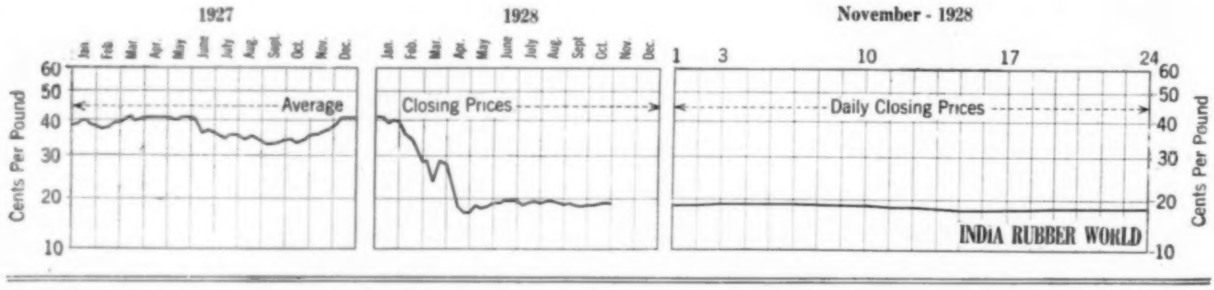
The market of the week terminated November 10 was rather dull with an easier tendency due to reports of large shipments from the eastern markets. Prices were off about ¼ to ⅜ cents a pound but caused no dumping of rubber on the market. Factory buyers continued to hope for lower prices and were willing to defer purchasing until the last moment.

Closing spot prices were: ribs 18½ cents buyers, 18⅝ cents sellers; first latex crepe 19¼ cents buyers, 19⅜ cents sellers; "B" blanket crepe 17½ cents buyers, 17⅝ cents sellers; "C" blanket crepe 17 cents buyers, 17¼ cents sellers.

Paras were rather neglected although the primary markets attempted to sustain the price. Upriver fine was quoted at 20 cents buyers, 20¼ cents sellers. Balatas were all slightly higher on reports of a higher foreign market but buyers in the New York market held off.

The market of the week ended No-

New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets



New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

Plantations	Oct. 22	23	24	25	26	27	29	30	31	Nov. 1	2	3	5	6*	7	8	9	10	12	13	14	15	16	17
Sheet																								
Ribbed smoked	18⅞	18⅞	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18⅝	18⅝	18¾	18¾	....	18¾	18⅝	18½	18⅜	18⅛	18⅛	18	17¾	17¾	17⅞
Crepe																								
First latex	19¾	19⅝	19⅝	19½	19½	19½	19½	19½	19½	19½	19⅜	19½	19½	....	19½	19½	19½	19¼	18⅞	19	18⅞	18¾	18⅞	19
"B" blanket	18½	18½	18¼	18⅜	18¼	18⅛	18⅛	18¼	17⅝	17¾	17¾	17¾	17⅞	....	17⅞	17¾	17¾	17½	17½	17⅜	17¼	16⅞	16¾	16⅝
"C" blanket	18¼	18¼	18½	18⅛	18⅛	18	18	18	17¾	17½	17½	17⅝	17⅝	....	17⅝	17½	17⅜	17¼	17¼	17⅛	17	16⅝	16½	16⅜
"D" blanket	18	18⅛	17⅞	17⅞	17⅞	17¾	17¾	17¾	17⅛	17¼	17¼	17⅜	17⅜	....	17⅜	17¼	17⅛	17	16⅞	16¾	16¾	16⅜	16¼	16⅛
No. 2 brown	18¼	18⅜	18⅛	18⅛	18	18	18	18	17¾	17½	17½	17⅝	17⅝	....	17⅝	17½	17½	17⅛	17⅛	17⅛	17	16⅝	16½	16½
Rolled brown	17	16⅞	16⅝	16¾	16¾	16¾	16¼	16¼	15⅞	15½	15½	15⅝	15½	....	15½	15¼	14⅞	14⅞	14¾	14¾	14¾	14	14	14⅛
Off latex	19½	19⅜	19⅜	19¼	19¼	19¼	19¼	19¼	19⅛	19⅛	19⅜	19¼	19¼	....	19¼	19⅛	19¼	19	18¾	18¾	18⅝	18½	18⅜	18¾

*Holiday.

vember 17 showed a mixed trend with easier prices and firm undertone. Factories bought futures fairly well at prices considered very low. Consumption figures showed a steady increase.

Closing spot prices were: ribs at 17¾ cents buyers, 17⅞ cents sellers; first latex crepe 18⅝ cents buyers, 18¾ cents sellers; "B" blanket crepe 16¾ cents buyers, 16⅞ cents sellers; "C" blanket crepe 16⅝ cents buyers, 16¾ cents sellers.

Paras lower, very quiet and neglected. Upriver fine at 19¼ cents buyers, 19½ cents sellers. Balatas were firmly held and but few sales reported.

The market of the week closed on November 24 exhibited little variations in prices yet considerable underlying strength. Factory buyers were holding off for lower prices. There was no selling pressure evident notwithstanding the heavy importations arriving.

Closing spot prices were: ribs 18¼ cents buyers, 18⅜ cents sellers; first latex crepe 19⅛ cents buyers, 19½ cents sellers; "B" blanket crepe 17⅛ cents buyers, 17¼ cents sellers; "C" blanket crepe 16¾ cents buyers, 16⅞ cents sellers.

Paras were very quiet and neglected with the primary market reluctant to sell and buyers showing no disposition to purchase at prevailing prices. Upriver fine closed at 18¾ cents buyers, 19 cents sellers. Balatas were firm. Block quoted at 47 cents and sheets at 50 cents. London and foreign markets firm.

October Imports

Importations of all grades in October were 42,515 tons, compared with 31,310 tons one year ago. Plantation arrivals for October were 41,571 tons, compared with 29,758 tons one year ago. Total importations of plantation rubber for ten months ended October 31 were 349,934 tons compared with 341,185 tons for the corresponding period of 1927. Total importations of all grades of rubber for the 10 months ended October 31 were 364,861 tons compared with 362,693 tons for the corresponding period of 1927.

RUBBER AFLOAT TO THE UNITED STATES

All figures in long tons

Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	Total
Nov. 3.	6,097	1,121	3,402	1,130	11,750
Nov. 10.	11,137	1,257	2,161	319	14,874
Nov. 17.	11,171	1,557	1,573	533	14,834

London

The London market like that in New York experienced a succession of weeks of mild activity with consumption of the steady hand-to-mouth variety. Prices were easy and declining. The effect of the removal of restriction was discounted and caused no disturbance in the market.

Closing buyers' prices on November 26 were as follows: ribbed smoked sheets, spot 8⅝ pence, December 18⅝ pence, January-March 8¾ pence, April-June 9 pence, July-September 9¼ pence.

The weekly record of London stocks since October 20 is as follows: October 27, 24,277 tons; November 3, 24,240 tons; November 10, 22,919 tons; November 17, 20,194 tons; November 24, 18, 724 tons.

Singapore

Market conditions shortly prior to the removal of export restrictions was recorded in the following terms by Guthrie & Co.

The future market shows little improvement and 1929 business is still difficult to negotiate. The trade, having covered a good proportion of its requirements ahead, is content to adopt a waiting policy. The possibility of full production overbalancing consumption is still the factor which sways the market and causes the vague uncertainty of the future.

New York Quotations

Following are the New York open market rubber quotations for one year ago, one month ago and November 26, the current date

Plantation Hevea	November 26, 1927	October 25, 1928	November 26, 1928
Rubber latex (Hevea)..gal.	$1.50 @	$1.40 @	$1.40 @
CREPE			
First latex spot	.40½ @	.19½ @ .20	.19 @ .19⅛
November-December	.40½ @	.19½ @ .20	.19 @ .19¼
January-March	.40¾ @	.19½ @ .20	.19 @ .19⅜
April-June	.42¼ @	.19⅝ @ .19¾	.19¼ @ .19⅜
Off latex, spot	.40 @	.19 @ .19½	.18¾ @
"B" Blanket, spot	.38½ @	.18¾ @	.17 @
November-December	.38½ @	.18¾ @	.17 @
January-March	.39¾ @	.18⅜ @ .18⅝	.17⅛ @
April-June	.40¼ @	.18½ @	.17¼ @ .17½
"C" Blanket, spot	.38 @	.18¼ @ .18½	.16¾ @
Brown No. 1	.38 @	.18½ @ .18¾	.17 @
Brown No. 2	.37 @	.18 @ .18¼	.16¾ @
Brown, roll	.34½ @	.17 @ .17¼	.14 @ .14¼
Sheet			
Ribbed, smoked spot	.40½ @	.18⅞ @ .19	.18 @
November-December	.40½ @	.18⅞ @ .19	.18 @
January-March	.41¾ @	.18⅞ @ .19⅛	.18¼ @
April-June	.42¼ @	.19 @ .19⅛	.18⅜ @
East Indian			
PONTIANAK			
Banjermasin	.09½ @ .10	@	.11 @
Pressed block	.15 @	.17½ @	.20½ @
Sarawak	.09½ @	@	@
South American			
PARAS			
Upriver, fine	.33 @	.21 @	.20½ @
Upriver, fine	@	*.25½ @	*.24½ @
Upriver, coarse	.26 @	.14½ @	.14 @
Upriver, coarse	@	*.20 @	*.20½ @
Islands, fine	.29 @	@	@
Islands, fine	@	*.25 @	*.24 @
Acre, Bolivian, fine	.33¼ @	.21½ @	.21 @
Acre, Bolivian, fine	@	*.26 @	*.25 @
Beni, Bolivian	.34 @	.22 @	.22 @
Madeira, fine	.34 @	.21 @	.21 @

South American PARAS—*Continued*	November 26, 1927	October 25, 1928	November 26, 1928
Peruvian, fine	@	$0.20½ @	$0.20¼ @
Tapajos, fine	@	.20 @	.20 @
CAUCHO			
Upper caucho ball	$0.26 @	.13 @	.13 @
Upper caucho ball	@	*.20 @	*.20½ @
Lower caucho ball	.24½ @	.12½ @	.12½ @
Maniçobas			
Ceará negro heads	†.25 @	†.17 @	†.17 @
Ceará scrap	†.16 @	†.09 @	†.09 @
Maniçoba, 30% guaranteed	.30 @	†.19 @	†.19 @
Mangabiera, thin sheet	.32 @	†.19 @	†.19 @
Centrals			
Central scrap	.26 @	.14¼ @ .14¾	.13 @
Central wet sheet	.20 @	.10 @ .12	.10 @
Corinto scrap	.26 @	.14¼ @ .14¾	.13 @
Esmeralda sausage	.26 @	.14¼ @ .14¾	.13 @
Guayule			
Duro, washed and dried	.31 @	.17½ @	.17½ @
Ampar	@	.18½ @	.18½ @
Gutta Percha			
Gutta Siak	.21 @ .21½	.22 @ .22½	.25 @
Gutta Soh	.35 @	.32 @ .34	.37 @
Red Macassar	3.00 @ 3.50	2.75 @ 3.00	2.90 @
Balata			
Block, Ciudad Bolivar	.47 @ .48	.46 @ .47	.50 @
Colombia	.39 @	.46 @ .47	.47½ @
Manaos block	.48 @ .49	.47 @ .48	.56 @
Panama	†.39 @	.46 @ .47	.47½ @
Surinam sheet	.57 @	.45 @ .47	.50½ @
Amber	.60 @	.50 @ .52	.53 @
Chicle			
Honduras	‡.68 @	‡.68 @	‡.68 @
Yutacan, fine	‡.68 @	‡.68 @	‡.68 @

*Washed and dried crepe. Shipment from Brazil.
†Nominal. ‡Duty paid.

New York Outside Market—Spot Closing Rubber Prices—Cents, Per Pound

PLANTATIONS	November, 1928 19	20	21	22	23	24
Sheet						
Ribbed smoked	17⅞	18	18	18	18	18
Crepe						
First latex	19	19	19	19	19	19
"B" blanket	16¾	16¾	16⅞	16⅞	16⅞	17
"C" blanket	16½	16½	15⅝	16⅝	16⅝	16⅜
"D" blanket	16¼	16¼	16⅜	16⅜	16⅜	16⅛
No. 2 brown	16½	16½	16⅝	16⅝	16⅝	16⅝
Rolled brown	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛
Off latex	18¾	18¾	18¾	18¾	18¾	18¾

Low and High New York Spot Prices

	November 1928*	1927	1926
PLANTATIONS			
First latex crepe	$0.18¾ @ $0.19¾	$0.35¼ @ $0.41¼	$0.37¼ @ $0.42
Smoked sheet, ribbed	.17¾ @ .18⅞	.35⅛ @ .41⅛	.37⅛ @ .42
PARAS			
Upriver, fine	.19¼ @ .20½	.28 @ .35½	.32 @ .38
Upriver, coarse	.13¾ @ .14⅛	.21⅛ @ .28	.22 @ .28½
Islands, fine	.18½ @ .19	.26¼ @ .28¾	.28 @ .34

* Figured to November 24, 1928.

Reclaimed Rubber

CONSUMING demand for tire and tube reclaims continues to increase from month to month because its demonstrated technical value places it as a staple ingredient in current compounding. Reclaiming plants are operating 24 hours daily on 3 shifts to meet contract demand placed for early delivery in 1929.

In the development of rubber technology reclaims are accepted as indispensable both technically and on the score of economy.

These important characteristics are the essential features underlying the importance of reclaim as a stabilizer of quality and values.

Current price quotations are unchanged from those recorded one month ago. In fact reclaim quotations have been stabilized for the past 3 months under the influence of crude rubber at 18 to 19 cent levels. Prices on all grades are very competitive and represent values exceedingly favorable to manufacturers of rubber goods of every grade. At present prices any of these are distinctly lower in volume cost than crude rubber.

New York Quotations

November 26, 1928

High Tensile	Spec. Grav.	Price Per Pound
Super-reclaim, black	1.20	$0.12½ @ $0.13
red	1.20	.13¼ @ .13½

Auto Tire	Spec. Grav.	Price Per Pound
Black	1.21	$0.07½ @ $0.07¾
Black selected tires	1.18	.08 @ .08¼
Dark gray	1.35	.09½ @ .09¾
Light gray	1.38	.12 @ .12½
White	1.40	.13 @ .13½
Shoe		
Unwashed	1.60	.07¼ @ .07½
Washed	1.50	.10 @ .10¼
Tube		
No. 1	1.00	.14 @ .14½
No. 2	1.10	.11 @ .11½
Miscellaneous		
Red	1.35	.13 @ .13¼
Truck tire, heavy gravity	1.55	.07 @ .07¼
Truck tire, light gravity	1.40	.07½ @ .07¾
Mechanical blends	1.60	.06¾ @ .07¼

Rubber Scrap

THE demand for rubber scrap continues to be maintained at as large a tonnage as in October. The opinion of many dealers is that scrap stocks are not greatly in excess of demand, therefore the occurrence of snow and heavy winter weather is liable to cause an advance in prices if reclaiming operations proceed at the same rate as in the past few months. On all grades except white beadless and motor truck tires the demand is active. Mixed auto tires with beads, mixed beadless auto tires and peelings have advanced slightly.

Boots and shoes are dull and virtually unchanged from a month ago.

Air brake hose has advanced strongly. Other grades of mechanical scrap are unchanged and dull.

All grades of inner tubes are active, and prices have a slightly upward trend.

Hard rubber scrap, No. 1 grade is practically unavailable. Since hard rubber battery boxes are no longer made, that grade has disappeared from the market.

In the past month there was a notable increase of inquiries for scrap from Europe.

Attention is called to the changed basis of scrap quotations adopted this month. In place of giving New York quotations for scrap, consumers buying prices for eastern market delivery in carload lots are given. The advances noted as compared to last month are therefore more apparent than real.

CONSUMERS' BUYING PRICES

Carload Lots

East of Pittsburgh, Pa.

November 26, 1928

Boots and Shoes		Prices
Boots and shoes, black	*lb.*	$0.01¼ @ $0.01⅜
Untrimmed arctics	*lb.*	.00¾ @ .00⅞
Tennis shoes and soles	*lb.*	.00¾ @ .01

Mechanicals		Prices
Mixed black scrap	*lb.*	$0.00½ @ $0.00⅝
Hose, air brake	*ton*	32.50 @ 35.00
regular soft	*ton*	17.50 @ 20.00
No. 1 red	*lb.*	.02 @ .02¼
No. 2 red	*lb.*	.01 @ .01⅛
White, druggists' sundries	*lb.*	.02 @ .02½
Mechanical	*lb.*	.01½ @ .01⅝
Tires		
Pneumatic Standard—		
Mixed auto tires with beads	*ton*	23.50 @ 24.50
Beadless	*ton*	32.00 @ 34.00
White auto tires with beads	*ton*	45.00 @ 47.50
Beadless	*ton*	60.00 @ 62.50
Mixed auto peelings	*ton*	34.00 @ 36.50
Solid—		
Mixed motor truck, clean	*ton*	19.00 @ 20.00
Inner Tubes		
No. 1, floating	*lb.*	.06½ @ .06¾
No. 2, compounded	*lb.*	.04 @ .04⅛
Red	*lb.*	.05¼ @ .05⅜
Mixed tubes	*lb.*	.04¼ @ .04⅜
Hard Rubber		
No. 1 hard rubber	*lb.*	.08 @ .08½

New Rubber-Seaweed Paper

Rubber and kelp or seaweed are combined with other materials to make a paper which is said to take as high a finish and to withstand as high a bursting test as the best kraft paper.[1] After being well washed to remove sand, etc., the kelp is macerated in warm or boiling water slightly alkalized until it is jelly-like. With it is then incorporated paper-makers' fibrous and other products and rubber, the latter being said to markedly enhance such qualities as flexibility, dielectric and tensile strength, and moisture-resistance. Either sheet crepe, virgin latex, or dispersed rubber may be used, the rubber being first brought to a colloidal condition by means of colloidal clay, as kaolin, and having, if crude rubber, been first finely shredded, soaked, and agitated in water until it has swelled considerably. The rubber proportion is three parts to one of clay, on a dry basis, and the clay is first put in the paper-beating machine with enough water to form a gruel-like paste and mixed until it resembles thick putty. The rubber is then added, water is steadily introduced, and as the rubber swells the mass the beating is continued until the rubber becomes emulsified.

The proportion of the rubber varies with the nature of the final products. For thin sheet paper and paper board, proportions may vary from one-half to five per cent. Floor carpeting may require twenty or more. A vulcanizating agent may be added to the rubber, and the latter may be cold-vulcanized in the finishing operation. Blown linseed or other oxidizable oil may also be added in the beater, or glycerine to get a softening effect. To the rubber-kelp-fiber paste may be added bodying and surfacing agents such as resins, glues, metallic soaps, resin soap, blood, sodium or potassium silicate, casein, stearin, paraffine, etc.

[1] George Frederick Blombery, United States patent No. 1,675,244.

Resilient Tire-Filler

A resilient composition for filling tire casings and for supplanting inner tubes is composed of ground burnt cork 5, glue 3.5, linseed and castor oil 1, rubber latex 0.5, and "cellulose derivatives" 0.25 parts mixed with 2 to 4 per cent of caustic soda, about 2 per cent of manganese or lead oxide, or zinc dichloride, and 2 per cent of chrome alum, steam being blown through the mixture for 5 to 10 hours. About 2 per cent of turpentine is then added and heated air is passed through the mass for 4 to 12 days, after which it is rolled and molded.—British patent 283,249, Sept. 25, 1926.

Compounding Ingredients

THE consumption of compounding ingredients of all varieties has been steadily maintained during November at the heavy volume noted in recent months. This is due chiefly to the full schedules in force for tire production. The present level of business in rubber compounding materials is expected to continue undiminished through the winter.

ACCELERATORS. A notable feature concerning accelerators is the marked and rapidly increased interest on the part of compounders and rubber manufacturers in the semi-ultra types of accelerators. These are well adapted for general use and impart excellent physical properties to rubber products.

ANTI-OXIDANTS. All of the anti-oxidants now available commercially are meeting with growing favor. They were not originally accepted by rubber manufacturers with the same degree of favor as accelerators but are now considered as decidedly advantageous for maintaining the life even of the cheaper lines of rubber products.

BENZOL. The supply has been held down to moderate proportions owing to the continuous heavy demand both for export and domestic consumption. Prices are firm and stocks sold ahead.

CARBON BLACK. Rubber makers' standard grade is available at moderate prices and contracts have been written for a good part of the 1929 needs of the rubber manufacturing industry.

CLAY. The general acceptance of hard clay as a cheap and good compounding ingredient maintains its consumption at a high volume of tonnage both for tires and mechanical rubber goods.

DEGRAS. This natural wool grease product is in steadily increasing demand as a softener in rubber mixings and is very steady at firm and moderate price.

LITHARGE. This material was in steady hand-to-mouth routine movement at firm prices.

LITHOPONE. Routine business early in November was succeeded by good spot demand toward the close of the month. Considerable booking of contracts for 1929 consumption has taken place on the basis of 1928 prices.

MINERAL RUBBER. Mineral rubber consumption is not only well sustained but seems to be gaining because of the inherent adaptability of this material for use in all classes of dark colored rubber goods.

SOLVENT NAPHTHA. Solvent naphtha has been notably less active than customary at moderate prices. Refiners are, however, firmly maintaining the price undiminished.

V. M. P. NAPHTHA. Prices are steady and there exists an active spot demand.

STEARIC ACID. Active and steady consumption exists for rubber work at firm prices.

ZINC OXIDE. Steady spot movement at unchanged prices. Heavy sales have been made on contract for 1929 consumption by the rubber trade.

New York Quotations

November 26, 1928

Accelerators, Inorganic

Lead, carbonate	lb.	$0.08½	@	
Lead, red	lb.	.10	@	
sublimed white	lb.	.07¾	@	
sublimed blue	lb.	.07¾	@	
super-sublimed white lead	lb.	.08¼	@	
Lime, R. M. hydrated	ton	12.50	@	
Litharge	lb.	.09	@	
Magnesia, calcined heavy	ton	.06	@	.06½
Magnesium carbonate	lb.	75.00	@	
Orange mineral A.A.A.	lb.	.12	@	

Accelerators, Organic

A-7	lb.	.55	@	.65
A-11	lb.	.62	@	.75
A-16	lb.	.57	@	.65
A-19	lb.	.58	@	.75
A-20	lb.	.64	@	.80
A-32	lb.	.78	@	.95
Aero X	lb.		@	
Aldehyde ammonia	lb.	.65	@	.70
B. B.	lb.		@	
Captax	lb.		@	
Crylene, hard form	lb.		@	
Paste	lb.		@	
Di-ortho-tolylguanidine	lb.	.44	@	.46½
D. P. G.	lb.	.35	@	.37½
Ethylidine aniline	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.31	@	.35½
Grasselerator 102	lb.	.58½	@	.61
552	lb.	4.45	@	
808	lb.	.79	@	.85
833	lb.	1.17	@	1.30
Heptene	lb.		@	
Hexamethylene tetramine	lb.	.62½	@	.65
Lead oleate, No. 999	lb.	.15½	@	
Witco	lb.	.14	@	
Methylene dianiline	lb.	.31	@	.37
Monex	lb.		@	
Piperidine pentamethylene dithio carbamate	lb.	4.45	@	4.60
Plastone	lb.		@	
R-2	lb.	2.00	@	2.50
R. & H. 40	lb.	.40	@	.42½
50	lb.	.40	@	.42½
Safex	lb.		@	
Super-sulphur, No. 1	lb.		@	
No. 2	lb.		@	
Tensilac No. 39	lb.	.50	@	.52½
No. 41	lb.	.50	@	.52½
Thermlo F.	lb.	.50	@	.55
Thionex	lb.	3.25	@	
Thiocarbanilid	lb.	.25½	@	.26½
Trimene	lb		@	
base	lb.		@	
Triphenylguanidine	lb.	.60	@	.65
Tuads	lb.		@	
Vulcanex	lb.	.58	@	
Vulcanol	lb.	.80	@	
Vulcone	lb.	.58	@	
ZBX	lb.		@	
Z-88	lb.	.50	@	.60
Zimate	lb.		@	

Acids

Acetic 28% (bbls.)	100 lbs.	3.88	@	4.13
glacial (carboys)	100 lbs.	14.18	@	14.43
Sulphuric, 66°	100 lbs.	1.60	@	

Alkalies

Caustic soda, solid	lb.	$0.03	@	

Anti-Oxidants

Age-Rite, powder	lb.		@	
resin	lb.		@	
white	lb.		@	
Antox	lb.		@	
Grasselerager A	lb.	.52	@	.55
Neozone	lb.	.69	@	
A	lb.	.61	@	
Oxynone	lb.	.68	@	.90
Resistox	lb.	.54	@	.65
Stabilite	lb.	.64	@	
V. G. B.	lb.		@	

Colors

BLACK

Bone	lb.	.07	@	.08½
Carbon (see compounding ingredients)				
A. & W. nonfli No. 1	lb.	.40	@	
Drop	lb.	.05½	@	.15
Gastex	lb.	.05½	@	.08
Lampblack (commercial)	lb.	.09	@	

BLUE

A. & W. blue	lb.	1.25	@	5.00
Akco blue	lb.	1.80	@	
Du Pont, N.	100 lbs.	1.35	@	
Marine, A. C.	100 lbs.	1.30	@	
5 R.	100 lbs.	1.00	@	
2 G.	100 lbs.	.70	@	
Huber Brilliant	lb.	4.20	@	4.70
Prussian	lb.	.32	@	.35
Ultramarine	lb.	.09	@	.30

BROWN

Huber Mocha	lb.	1.60	@	2.10
Sienna, Italian, raw	lb.	.05½	@	.12½

GREEN

A. & W. green	lb.		@	
Akco green	lb.	2.60	@	
Chrome, light	lb.	.27	@	.31
medium	lb.	.28	@	.31
Du Pont, A. C.	100 lbs.	3.00	@	
4 G.	100 lbs.	.60	@	
G. L.	100 lbs.	.30	@	
Y. L.	100 lbs.	.75	@	
Huber Brilliant	lb.	4.35	@	
Oxide of chromium	lb.	.34	@	.38

ORANGE

Du Pont, 2 R.	100 lbs.	1.40	@	
R. X.	100 lbs.	1.30	@	
Y. O.	100 lbs.	1.60	@	
Huber Persian	lb.	.50	@	1.00

RED

A. & W. red	lb.	0.75	@	2.50
purple	lb.	1.25	@	2.00
Akco red	lb.	2.75	@	
Antimony, golden, No. 40	lb.		@	
No. 60	lb.	.16	@	.20
golden 15/17%	lb.	.20	@	.25
Aristi	lb.	2.75	@	
Huber Brilliant	lb.	1.35	@	1.85

Colors—(Continued)

RED

Antimony				
Crimson, R.M.P. No. 3	lb.	$0.48	@	
Sulphur free	lb.	.52	@	
7-A.	lb.	.35	@	
Z-2	lb.	.22	@	
Vermilion, No. 5	lb.		@	
No. 15	lb.		@	
Du Pont, R. I.	100 lbs.	1.75	@	
6 B.	100 lbs.	.90	@	
Brilliant A. C.	100 lbs.	.90	@	
Iron Oxides				
bright pure domestic	lb.	.12	@	
bright pure English	lb.	.14	@	
bright reduced English	lb.	.10	@	
bright reduced domestic	lb.	.10	@	
Indian (maroon), pure domestic	lb.	.11	@	
Indian (maroon), pure English	lb.	.11	@	
Indian (maroon), reduced English	lb.	.09½	@	
Indian (maroon), reduced domestic	lb.	.08	@	
Oximony	lb.	.13¼	@	
Spanish red oxide	lb.	.03	@	.04¼
Sunburnt red	lb.	.15	@	
Venetian reds	lb.	.02½	@	.06
Vermilion, Eng. quicksilver	lb.	1.95	@	

WHITE

Lithopone	lb.	.05¼	@	
Albalith	lb.		@	
Azolith	lb.	.05¼	@	.05¾
Grasselli	lb.	.05¼	@	.05¾
Sterling	lb.		@	
Vanolith	lb.	.05¾	@	
Titanox	lb.	.10	@	.10½
Zinc Oxide				
AAA (lead free)	lb.	.07	@	
Azo (factory):				
ZZZ (lead free)	lb.	.06⅜	@	.07
ZZ (leaded)	lb.	.06⅜	@	.06⅞
Z (8% leaded)	lb.	.06⅜	@	.06⅞
French Process				
Green seal	lb.	.10⅜	@	.10⅞
Red seal	lb.	.09⅜	@	.09⅞
White seal	lb.	.11⅜	@	.11⅞
Kadox	lb.		@	
XX	lb.		@	

YELLOW

A. & W. yellow	lb.	1.60	@	4.00
Akco yellow	lb.	1.45	@	
Cadmium sulphide	lb.	.75	@	.85
Chrome	lb.		@	
Du Pont N.	100 lbs.	4.00	@	
R. W.	100 lbs.	.78	@	
Grasselli cadmium	lb.		@	
Huber canary	lb.	3.30	@	3.80
Ochre, domestic	lb.	.01¾	@	.02¾
Oxide, pure	lb.	.08¾	@	
Zinc imported	lb.	.23	@	

Compounding Ingredients

Aluminum flake (sacks, c.l.)	ton	21.85	@	
(sacks l.c.l.)	ton	24.50	@	
Ammonium carbonate pwd.	lb.	.11	@	
lump	lb.	.10	@	
Asbestine	ton	13.40	@	14.50
Barium, carbonate	ton	60.00	@	

New York Quotations

November 26, 1928

Compounding Ingredients *(Continued)*

Baryta white (f.o.b. St. Louis)	*ton*	$23.00	@	
Barytes, imported	*ton*	27.00	@	34.00
pure white	*ton*	37.50	@	
off color	*ton*	25.00	@	
medium	*ton*	32.50	@	
Foam "A" (f. o. b. St. Louis, bbls.)	*ton*	23.00	@	
Foam "A" (f. o. b. St. Louis, bags)	*ton*	23.00	@	
Basofor	*lb.*	.04½	@	
Blanc fixe, dry	*lb.*	.04½	@	
pulp	*ton*	42.50	@	45.00
Carbon Black				
Aerfloted arrow	*lb.*	.08½	@	.12
Compressed	*lb.*	.08	@	.12
Uncompressed	*lb.*	.07½	@	.11½
Fumonex	*lb.*	.06	@	.09
Micronex	*lb.*	.08½	@	.12½
Carrara filler	*ton*	20.00	@	
Chalk	*ton*	12.00	@	
Clay, Blue Ridge, dark	*ton*		@	
Blue Ridge, light	*ton*		@	
China	*lb.*	.01¼	@	
Dixie	*ton*		@	
Langford	*ton*		@	
Mineral flour (Florida)	*ton*		@	
Perfection	*ton*	14.00	@	
Suprex	*ton*	10.00	@	22.00
Tensulite	*ton*	12.00	@	
Cotton flock, black	*lb.*	.13	@	
light-colored	*lb.*	.09½	@	.14½
white	*lb.*	.12	@	.27
Glue, high grade	*lb.*	.24	@	.28
low grade	*lb.*	.21	@	.25
Infusorial earth	*ton*	45.00	@	
Mica, amber (fact'y)	*ton*	90.00	@	
Neomerpin, S. A. conc.	*lb.*	.60	@	
Pumice stone, powd.	*lb.*	.02½	@	.04
Rotten stone (bbls.)	*lb.*	.02½	@	.04½
Soap bark	*lb.*	.15½	@	.16
Soapstone	*ton*	15.00	@	22.00
Talc, domestic	*ton*	25.00	@	
French	*ton*	18.00	@	22.00
Pyrax A	*ton*		@	
B	*ton*		@	
Thermatomic carbon	*lb.*		@	
Velvetex	*lb.*	.04½	@	.06
Whiting:				
Domestic	100 *lbs.*	1.00	@	
English, cliffstone	100 *lbs.*	1.50	@	
Quaker	*ton*		@	
Snow white	*ton*		@	
Sussex	*ton*		@	
Vancolloid	*ton*	27.00	@	
Vansulite	*ton*	12.00	@	
Westminster Brand	100 *lbs.*		@	
Witco (c.l.) (fact'y)	*ton*	12.00	@	
Whiting, imp. chalk	100 *lbs.*	.90	@	1.10
Paris White, Eng. Cliff.	100 *lbs.*	1.50	@	2.75

Factice—See Rubber Substitutes

Mineral Rubber

Fluxrite (solid)	*lb.*	$0.05	@	$0.06
Genasco (fact'y)	*ton*	50.00	@	52.00
Gilsonite (fact'y)	*ton*	37.14	@	39.65
Granulated M. R.	*ton*		@	
Hydrocarbon, hard	*ton*		@	
Hydrocarbon, soft	*ton*		@	
Ohmlac Kapak, M. R.	*ton*	40.00	@	90.00
M-4	*ton*	175.00	@	
Paradura (fact'y)	*ton*	62.50	@	65.00
Pioneer, M. R., solid (fac.)	*ton*	40.00	@	42.00
M. R. granulated	*ton*	50.00	@	52.00
Robertson, M. R., solid (fact'y)	*ton*	34.00	@	80.00
M. R. gran. (fact'y)	*ton*	38.00	@	80.00
Vansul Puro	*ton*	27.00	@	

Oils

Mineral	*gal.*	.20	@	
Kerosene	*gal.*	.15	@	
Rapeseed	*gal.*	.83	@	
Red oil, distilled	*lb.*	.09¼	@	.10¼
Rubber process	*gal.*	.25	@	
Spindle	*gal.*	.30	@	

Rubber Substitutes or Factice

Black	*lb.*	.08	@	.14
Brown	*lb.*	.08	@	.15
White	*lb.*	.09	@	.16

Softeners

Burgundy pitch	100 *lbs.*	5.00	@	6.00
Atlas	100 *lbs.*	6.50	@	
Corn oil	*lb.*	.10½	@	
Cottonseed oil	*lb.*	.10	@	
Cycline oil	*gal.*	.28	@	.35
Degras	*lb.*	.03½	@	.04½
Fluxrite (fluid)	*lb.*	.05	@	.06
Moldrite	*lb.*	.07	@	.07½
Palm oil (Lagos)	*lb.*	.09	@	
Palm oil (Niger)	*lb.*	.08¾	@	
Palm oil (Witco)	*lb.*	.09	@	
Para-flux	*gal.*	.17	@	
Petrolatum, snow white	*lb.*	.08½	@	.08¾
Pigmentar	*gal.*	.33	@	.39
Pine oil, steam distilled	*gal.*	.63	@	.64
Rosin K	*bbl.*	9.85	@	
Rosin oil, compounded	*gal.*	.30	@	
No. 3	*gal.*	.61	@	
No. 556	*gal.*	.53	@	
Rubite	*lb.*	.10	@	
Rubtack	*lb.*	.10	@	
Shellac, orange	*lb.*	.70	@	

Softeners—*(Continued)*

Stearex	*lb.*	$0.16	@	$0.20
Stearic acid, double pressed	*lb.*	.13	@	.13½
Tackol	*lb.*	.09	@	.15
Tar (retort)	*bbl.*	12.50	@	13.00
Tasco W-S No. 1	*lb.*	.06	@	
A	*lb.*	.05	@	
Vansulol	*lb.*	.12½	@	
Vantar (Pine Tar)	*gal.*	.35	@	
Waxene	*lb.*	.30	@	.40
Woburn oil	*lb.*	.05½	@	.06

Solvents

Benzol (90%, 7.21 lbs. gal.)	*gal.*	.27	@	.28
Carbon bisulphide (99.9%, 10.81 lbs. gal.) (drums)	*lb.*	.05	@	.06
tetrachloride (99.7%, 13.28 lbs. (gal.) (drums)	*lb.*	.06¼	@	.06¾
Cyclohexanone	*lb.*	.60	@	
Dip-Sol	*gal.*	.13	@	
Dryolene	*gal.*	.12	@	
Gasoline				
No. 303				
Tankcars	*gal.*	.15	@	
Drums, c. l.	*gal.*	.31	@	
Drums, l. c. l.	*gal.*	.36	@	
Hexalin	*lb.*	.60	@	
acetate	*lb.*	.70	@	
Rubberlene	*gal.*	.12	@	
Rub-Sol	*gal.*	.11	@	
Solvent naphtha	*gal.*	.35	@	
Stod-Sol	*gal.*	.11	@	
Sweet rubber cement naphtha	*gal.*	.16½	@	
Turpentine, Venice	*lb.*	.20	@	
steam distilled	*gal.*	.53	@	.54

Vulcanizing Ingredients

Sulphur				
Velvet flour (240 lb. bbls.)	100 *lbs.*	2.95	@	3.50
(150 lb. bags)	100 *lbs.*	2.60	@	3.15
Soft rubber (c.l.)	100 *lbs.*	2.40	@	2.75
(l.c.l.)	100 *lbs.*		@	
Superfine commercial flour				
(210 lb. bbls.)	100 *lbs.*	2.55	@	3.10
(100 lb. bags)	100 *lbs.*	2.40	@	2.80
Tire brand, superfine	100 *lbs.*	1.90	@	2.25
Tube brand, velvet	100 *lbs.*	2.40	@	2.75
Sulphur chloride	*lb.*	.03¼	@	.03½
Vandex (selenium)	*lb.*		@	
(See also Colors—Antimony)				

Waxes

Beeswax, white, com.	*lb.*	.35	@	
carnauba	*lb.*	.33	@	
ceresine, white	*lb.*	.12	@	
montan	*lb.*	.07½	@	
ozokerite, black	*lb.*	.27	@	
green	*lb.*	.28	@	
Paraffin				
122/124 white crude scale	*lb.*	.06	@	
124/126 white crude scale	*lb.*	.06	@	
120/122 fully refined	*lb.*	.07½	@	
125/127 fully refined	*lb.*	.07½	@	

Rims Approved by Tire & Rim Association

Rim Size	October, 1928		10 Months, 1928	
	Number	Per Cent	Number	Per Cent
Motorcycle				
28 x 2½	....	...	....	...
24 x 3	....	...	38,329	0.2
26 x 3	8,207	0.4	50,418	0.2
28 x 3	....	...	753	0.0
Clincher				
30 x 3½	150,199	7.1	682,604	3.1
31 x 4	1,994	0.1	4,386	0.0
18" Balloons				
18 x 3½	....	...	9,362	0.0
18 x 4	82,207	3.9	1,114,219	5.1
18 x 3.25	18,800	0.9	148,278	0.7
18 x 4½	19,054	0.9	137,366	0.6
18 x 5	2,618	0.1	9,095	0.0
19" Balloons				
19 x 2.75	48,740	2.3	158,639	0.7
19 x 3½	169,586	8.2	1,638,877	7.5
19 x 4	365,432	17.3	2,520,291	11.5
19 x 3.25	22,042	1.0	30,706	0.1
19 x 4½	89,507	4.2	845,995	3.9
19 x 5	21,287	1.0	68,236	0.3
20" Balloons				
20 x 2.75	68,720	3.3	280,657	1.3
20 x 3½	10,152	0.5	398,888	1.8
20 x 4	183,254	8.7	3,033,286	13.8
20 x 4½	97,090	4.6	568,330	2.6
20 x 5	51,744	2.4	670,907	3.1
20 x 6	10,545	0.5	103,068	0.5
21" Balloons				
21 x 2.75	43,451	2.1	4,717,041	21.6
21 x 3½	175,823	8.3	883,806	4.0
21 x 4	19,868	0.9	508,431	2.3
21 x 4½	17,927	0.8	285,256	1.3
21 x 5	3,160	0.1	11,758	0.1
21 x 6	1,467	0.1	5,700	0.0
22" Balloons				
22 x 3½	....	...	1,775	0.0
22 x 4	154	0.0	3,351	0.0
22 x 4½	1,372	0.1	3,812	0.0

Rim Size High Pressure	October, 1928		10 Months, 1928	
	Number	Per Cent	Number	Per Cent
30 x 3½-23	42,123	2.0	96,428	0.4
31 x 4 -23	....	...	640	0.0
32 x 4½-23	16,146	0.8	94,467	0.4
32 x 4 -24	9,327	0.4	84,405	0.4
33 x 4½-24	297	0.0	2,613	0.0
32 x 3½-25	....	...	50	0.0
33 x 4 -25	498	0.0	2,696	0.0
34 x 4½-25	1,935	0.1	8,312	0.0
20" Truck				
30 x 5	270,088	12.8	1,968,747	9.0
32 x 6	53,028	2.5	403,763	1.8
34 x 7	16,819	0.8	113,753	0.5
36 x 8	5,859	0.3	63,159	0.3
40 x 10	....	...	4,241	0.0
22" Truck				
36 x 7	....	...	8,987	0.0
38 x 8	785	0.0	1,514	0.0
24" Truck				
34 x 5	1,361	0.1	15,942	0.1
36 x 6	1,509	0.1	36,775	0.2
38 x 7	6,870	0.3	48,719	0.2
40 x 8	2,460	0.1	27,276	0.1
44 x 10	....	...	796	0.0
Airplane				
8 x 3 SS	....	...	82	0.0
12 x 3 SS	236	0.0	343	0.0
18 x 3 SS	....	...	471	0.0
20 x 3 SS	....	...	6	0.0
20 x 3½ SS	10	0.0	1,598	0.0
20 x 4 SS	350	0.0	1,100	0.0
21 x 4 SS	....	...	21	0.0
20 x 5 SS	....	...	98	0.0
20 x 6 SS	32	0.0	2,343	0.0
20 x 8 SS	176	0.0	182	0.0
24 x 10 SS	58	0.0	111	0.0
18 x 4 Cl	244	0.0	9,586	0.0
Totals	2,114,611	...	21,932,844	...

Cotton and Fabrics

AMERICAN COTTON. The price of middling spot cotton on November 1 was 19.50 cents compared with 19.45 cents on October 1. On November 7, the day following the national election the price had declined to 19.00 cents but immediately thereafter rose steadily with but slight occasional recessions and on the 24th of the month reached 20.60 cents. This rise may have been due in part to the results of the election aided by the occurrence in rapid succession of the phenomenal bull market, the government report of crop condition, current domestic consumption, etc. The trend if continued is expected to result in higher prices.

The government's November 1 crop report indicated 14,133,000 bales of 500 pounds gross. Estimated consumption is placed as high as 15,000,000 with the world's carry over placed at 5,100,000 bales.

Arizonas and Pimas are moving freely and maintaining a level of approximately 40 cents for No. 2 which is in line with Sakel quotations.

EGYPTIAN COTTON. During the past month all staple markets were weak. The basis, particularly on Americans, was the cheapest for years and not liable to be duplicated for years to come. A very cheap basis in the past has always stimulated consumption and turned production to shorter cottons which show a much higher yield per acre.

Egyptians Uppers are in large supply and cheap. Spinners are taking advantage of this and are anticipating their requirements for many months ahead. Sakels, however, are firm and prices are much higher relatively than the shorter staple cottons.

Cotton Fabric

DUCKS. The market for hose and belting ducks continues with no surplus stocks in sight as the product of the mills is contracted for covering several weeks in the future.

DRILLS AND OSNABURGS. The outstanding feature of the market is the sharp demand for fabrics for nearby and the first quarter of next year. Some business is still passing for deliveries through the second quarter. Deliveries will for the most part continue to be the governing factor in trading on specialty fabrics rather than fractional differences in price. Higher prices are in prospect for the near future.

RAINCOAT FABRICS. The raincoat business today is very quiet due to the fact that in the past six weeks there has been only two days of rainy weather. Practically the only goods being sold for raincoat purposes are heavy and light leatherette fabrics, and these only in small quantities.

SHEETINGS. Very little development has occurred the past month in the market for sheetings. Buying has been rather scattered but considerably better inquiry is anticipated during the remainder of this year.

TIRE FABRICS. Trade in tire fabrics was rather quiet during November. Both American and Egyptian cotton qualities were in fair demand with the greater interest in American. Prices held firm and unchanged the first three weeks of the month, becoming firm and higher early in the fourth week with the business attaining fair proportions.

Consumption of tire fabrics for nine months ended September 30 totaled 195,776,417 pounds compared with 177,979,818 pounds for the entire twelve months of 1927.

New York Quotations

November 26, 1928

Drills

38-inch 2.00-yard......*yard*	$0.17½ @	
40-inch 3.47-yard..........	.10¾ @	
50-inch 1.52-yard..........	.24⅝ @	
52-inch 1.90-yard..........	.19¾ @	
52-inch 2.20-yard..........	.17¼ @	
59-inch 1.85-yard..........	.20 @	

Ducks

38-inch 2.00-yard D. F.*yard*	.17¼ @	.17⅜
40-inch 1.45-yard S. F.....	.21⅞ @	.22
72-inch 1.05-yard D. F.....	.38⅛ @	.38½
72-inch 16.66-ounce........	@	
72-inch 17.21-ounce........	@	
MECHANICAL		
Hose and belting....*pound*	.36 @	
Specials	.40 @	
TENNIS		
52-inch 1.35-yard ......*yard*	.27½ @	

Hollands

R.T.5—30-inch ....*yard*	.16 @	
R.T.7—36-inch	.18 @	
R.T.8—40-inch	.20 @	
RED SEAL		
36-inch	.15½ @	
40-inch	.16½ @	
50-inch	.25 @	
GOLD SEAL		
40-inch, No. 72............	.20¾ @	
40-inch, No. 80..	.22 @	

Osnaburgs

40-inch 2.35-yard ......*yard*	$0.15¼ @	
40-inch 2.48-yard	.14½ @	
40-inch 3.00-yard	.12 @	
40-inch 10-oz. part waste..*lb.*	.19⅛ @	
37-inch 2.42-yard	.14¾ @	

Raincoat Fabrics

COTTON		
Bombazine 64 x 60....*yard*	.11 @	
Bombazine 60 x 48........	.10 @	
Plaids 60 x 48...........	.12 @	
Plaids 48 x 48...........	.10¾ @	
Surface prints 64 x 60.....	.13½ @	
Surface prints 60 x 48.....	.12½ @	
Print cloth 38½-in., 60 x 48.	.06¾ @	
Print cloth, 38½, 64x60....	.07¾ @	

Sheetings, 40-inch

48 x 48, 2.50-yard.....*yard*	.12¾ @	.13
48 x 48, 2.85-yard.........	.11¼ @	
64 x 68, 3.15-yard.........	.11⅞ @	.12
56 x 60, 3.60-yard.........	.09¾ @	.09⅞
44 x 48, 3.75-yard.........	.08⅝ @	.08¾

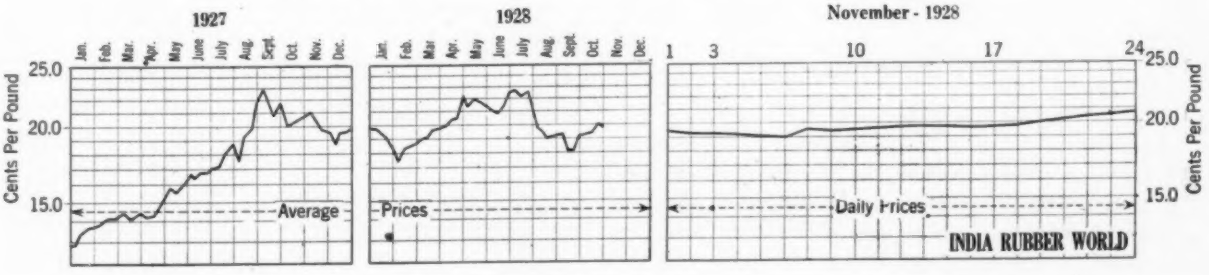
Sheetings, 36-inch

48 x 48, 5.00 yard......*yard*	.06⅞ @	.07
40 x 44, 6.15-yard........	.05⅝ @	

Tire Fabrics

SQUARE WOVEN 17¼-ounce		
Peeler, karded........*pound*	$0.49	@ $0.50
BUILDER 23/11		
Peeler, karded.......*pound*	.48½ @	.49
BUILDER 10/5		
Peeler, karded.......*pound*	.45½ @	.46
CORD 23/5/3		
Peeler, karded, 1 1/16-in..*pound*	.48½ @	
CORD 23/4/3		
Peeler, karded........*pound*	.49½ @	
CORD 23/3/3		
Peeler, karded........*pound*	.50½ @	
CORD 15/3/3		
Peeler, karded........*pound*	.46½ @	
CORD 13/3/3		
Peeler, karded........*pound*	.45½ @	
LENO BREAKER		
8-oz. Peeler, karded..*pound*	.48½ @	
10-oz. Peeler, karded.......	.48½ @	
CHAFER		
9.5-oz. Peeler, karded.*pound*	.52 @	
12-oz. Peeler, karded.......	.53 @	
14-oz. Peeler, karded.......	.48½ @	

Ratio Graph of New York Daily Prices of Spot Middling Upland Cotton



United States Statistics

IMPORTS OF CRUDE AND MANUFACTURED RUBBER

	August, 1928		Eight Months Ended August, 1928	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*Free*				
Crude rubber	69,157,005	$12,730,572	609,888,287	$177,487,635
Balata	892,176	165,460	1,653,840	363,447
Jelutong or Pontianak	1,011,170	126,962	9,418,335	1,444,776
Gutta percha	328,528	60,738	2,242,701	530,465
Guayule	....	....	6,890,852	1,755,529
Rubber scrap	1,885,404	39,506	13,188,633	472,546
Totals	73,274,283	$13,123,238	643,282,648	$182,054,398
Chicle ... *dutiable*	283,758	$147,346	9,524,955	$4,862,121
MANUFACTURED—*Dutiable*				
Rubber belting	51,704	$25,965	352,741	$196,152
Rubber tires	959	6,896	3,975	66,280
Other manufactures of rubber	....	144,399	....	1,073,799
Totals	52,663	$177,260	356,716	$1,336,231

EXPORTS OF FOREIGN MERCHANDISE

	August, 1928		Eight Months Ended August, 1928	
	Pounds	Value	Pounds	Value
RUBBER MANUFACTURES				
Crude rubber	5,323,441	$1,084,646	47,487,805	$13,290,133
Balata	13,171	1,999	180,806	69,113
Gutta percha, rubber substitutes and scrap	....	....	135,424	17,023
Rubber manufactures	....	6,075	....	322,354
Totals	5,336,612	$1,092,720	47,804,035	$13,698,623

EXPORTS OF DOMESTIC MERCHANDISE

	August, 1928		Eight Months Ended August, 1928	
	Pounds	Value	Pounds	Value
MANUFACTURED				
Reclaimed	2,036,523	$151,202	14,612,424	$1,147,124
Scrap and old	3,445,893	169,342	29,494,398	1,595,388
Rubberized piece goods and hospital sheeting ... *sq. yd.*	121,926	62,631	1,238,373	610,689
Footwear				
Boots ... *pairs*	216,677	444,553	706,360	1,648,605
Shoes ... *pairs*	370,479	441,910	1,427,497	1,409,085
Canvas shoes with rubber soles ... *pairs*	498,728	329,180	3,684,173	2,616,291
Rubber water bottles and fountain syringes .. *number*	43,665	22,208	237,334	150,820
Rubber gloves ... *doz. pairs*	8,227	23,179	69,200	184,445
Other druggists' rubber sundries	....	32,842	....	276,291
Rubber balloons ... *gross*	49,064	66,748	382,568	459,940
Rubber toys and balls	....	22,362	....	134,374
Bathing caps ... *doz.*	12,354	32,993	144,511	330,718
Hard rubber goods				
Electrical hard rubber goods	121,804	32,613	990,102	213,974
Other hard rubber goods	....	26,224	....	228,199
Tires				
Casings, automobile . *number*	204,406	2,451,950	1,617,255	20,393,444
Tubes, automobile .. *number*	147,805	306,058	1,065,017	2,297,747
Other casings and tubes *number*	4,820	10,768	36,079	77,280
Solid tires for automobiles and motor trucks .. *number*	5,599	163,412	37,598	1,285,885
Others	106,513	23,237	1,275,673	291,714
Tire accessories	....	114,461	....	1,137,370
Rubber and friction tape	150,383	42,522	1,053,106	318,123
Belting	475,275	274,212	3,309,391	1,892,668
Hose	616,981	222,510	4,861,814	1,781,395
Packing	194,207	86,536	1,874,566	845,982
Soles and heels	88,903	103,889	958,763	1,392,613
Thread	170,840	176,160	1,092,157	1,204,613
Rubber bands and erasers	64,833	40,855	608,027	411,208
Other rubber manufactures	....	223,851	....	1,728,139
Totals	....	$6,098,408	....	$46,064,124

Crude Rubber Imports by Customs Districts

	*September, 1928		Nine Months Ended *September, 1928	
	Pounds	Value	Pounds	Value
Massachusetts	2,478,926	$426,235	30,406,270	$8,512,745
Buffalo	....	....	12,060	2,290
New York	81,641,091	15,154,856	598,832,112	164,079,485
Philadelphia	267,235	46,152	21,313,987	7,276,492
Maryland	1,267,197	221,278	20,609,079	6,344,006
Los Angeles	3,061,848	564,898	23,047,468	6,252,158
San Francisco	73,664	22,344	989,368	269,992
Oregon	11,200	2,012	116,735	35,568
Michigan	....	....	33,600	10,080
Ohio	115,567	18,915	2,812,757	911,117
St. Louis	....	....	280,000	110,749
Wisconsin	....	....	56,000	21,982
Colorado	313,600	55,329	830,800	188,404
Totals	89,230,328	$16,512,019	699,340,236	$194,015,068

* Including latex, dry rubber content.

¶ *Compounders will find the classification of commercial organic accelerators by distinctive chemical groups, a practical help in simplifying their grasp on the subject.* *Turn to page 53.*

Philippine Islands Statistics

IMPORTS

	1927		1926	
RUBBER MANUFACTURES	Kilos	Value Pesos*	Kilos	Value Pesos*
Belting	75,370	199,378	45,908	153,182
Boots and shoes	14,205	14,113	15,260	22,039
Druggists' sundries	......	91,751	......	86,784
Fountain pens	......	245,506	......	210,791
Hose	102,846	176,351	70,540	138,361
Packing	52,469	85,785	41,427	80,839
Tires				
Automobile				
Pneumatic	1,726,836	3,653,313	734,828	2,046,103
Solid	430,232	399,134	241,473	291,085
Bicycle	29,220	59,404	......	......
Motorcycle	717	1,918	23,025	39,691
All other tires	79,026	94,444	91,049	122,339
Cement	35,376	25,289	......	......
Heels	1,340,176	122,733	......	......
Soles	124,073	39,694	......	......
Sheets	11,292	16,547	......	......
Other articles of rubber	207,650	262,271	......	436,835
Totals	4,229,488	5,487,631	1,263,510	3,628,049

EXPORTS

	1927		1926	
UNMANUFACTURED	Kilos	Value Pesos*	Kilos	Value Pesos*
Gutta percha	3,167	3,290	7,152	6,187
Rubber	296,399	409,684	228,381	336,291
Totals	299,566	412,974	235,533	342,478

* Philippine peso equals fifty cents United States currency.

Ceylon Rubber Exports

January 1 to September 7, 1928

	Tons
To United Kingdom	8,558.55
Continent	2,886.43
Australia	667.65
America	20,944.01
Egypt	10.00
Africa	15.61
India	13.84
Japan	79.99
Other countries in Asia	5.15
Total	33,181.23
For the same period last year	37,812.70

Annual Exports, 1921-1927

	Tons
For the year 1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88
1922	47,367.14
1921	40,210.31

British Malaya

RUBBER EXPORTS

An official cablegram from Singapore to the Malay States Information Agency, Malaya House, 57 Charing Cross, London, S. W. 1, England, states that the amount of rubber exported from British Malaya in October last totaled 24,441 tons. The amount of rubber imported was 12,603 tons, of which 9,604 tons were declared as wet rubber. The following are comparative statistics:

	1927		1928	
	Gross Exports Tons	Foreign Imports Tons	Gross Exports Tons	Foreign Imports Tons
January	34,946	14,995	27,731	16,618
February	27,528	11,697	28,813	12,911
March	41,346	17,462	27,813	10,508
April	29,041	13,069	20,029	9,335
May	31,393	15,491	26,403	10,350
June	32,607	14,706	22,930	16,168
July	23,947	12,697	30,405	13,383
August	30,371	17,105	35,593	15,114
September	29,835	12,095	29,700	11,239
October	29,846	15,801	24,441	12,603
Totals	310,860	145,118	273,858	128,229

The above figures represent the totals compiled from declarations received up to the last day of the month for export from and import to all ports of British Malaya and not necessarily the actual quantity shipped or landed during that month.

DISTRIBUTION

The following is a comparative return of distribution of shipments during the months of September and October, 1928.

	Sept., 1928 Tons	Oct., 1928 Tons
United Kingdom	2,883	1,686
United States	21,104	17,903
Continent of Europe	2,338	1,747
British Possessions	467	283
Japan	2,863	2,771
Other foreign countries	45	51
Totals	29,700	24,441

United Kingdom Statistics

IMPORTS

	September, 1928		Nine Months Ended September, 1928	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude Rubber				
From—				
Straits Settlements	8,644,200	£328,019	65,304,600	£3,254,204
Federated Malay States	4,729,500	174,276	33,824,900	1,653,817
British India	569,900	21,248	10,560,800	567,282
Ceylon and Dependencies	3,438,100	127,741	22,913,800	1,159,788
Other Dutch possessions in Indian Seas	2,480,000	89,545	18,751,800	971,264
Dutch East Indies (except other Dutch possessions in Indian Seas)	2,266,800	84,634	20,598,400	1,058,327
Other countries in East Indies and Pacific not elsewhere specified	98,900	3,650	2,511,800	127,117
Brazil	389,200	15,408	3,651,700	179,898
South and Central America (except Brazil)	......	......	226,200	11,432
West Africa				
French West Africa	11,300	444	100,400	4,196
Gold Coast	32,200	1,168	395,100	19,830
Other parts of West Africa	342,700	12,060	1,543,400	72,372
East Africa, including Madagascar	7,100	272	918,300	47,574
Other countries	69,400	3,051	1,215,300	59,508
Totals	23,079,300	£861,516	182,516,500	£9,186,609
Gutta percha and balata	283,700	20,489	2,455,600	203,707
Waste and reclaimed rubber	491,500	5,524	6,600,300	85,530
Rubber substitutes	13,700	446	28,700	893
Totals	23,868,200	£887,975	191,601,100	£9,476,739
MANUFACTURED				
*†‡Tires and tubes				
Pneumatic				
Outer covers	......	£52,381	......	£615,479
Inner tubes	......	8,807	......	119,240
Solid tires	......	11,053	......	57,228
Boots and shoes ..*doz. pairs*	53,292	144,290	642,985	1,217,910
Other rubber manufactures	......	110,345	......	1,341,625
Totals	......	£326,876	......	£3,351,482

EXPORTS

	September, 1928		Nine Months Ended September, 1928	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Waste and reclaimed rubber	2,241,400	£17,847	22,619,100	£176,016
Rubber substitutes	60,400	1,337	424,200	10,217
Totals	2,301,800	£19,184	23,043,300	£186,233
MANUFACTURED				
‡Tires and tubes				
Pneumatic				
Outer covers	......	£198,291	......	£1,924,800
Inner tubes	......	51,973	......	347,172
Solid tires	......	14,750	......	173,163
Boots and shoes...*doz. pairs*	21,548	39,918	204,220	331,398
Other rubber manufactures	......	212,121	......	2,290,007
Totals	......	£517,053	......	£5,066,540

EXPORTS—COLONIAL AND FOREIGN

	September, 1928		Nine Months Ended September, 1928	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude Rubber				
To—				
Russia	......	......	7,424,400	£491,931
Sweden, Norway and Denmark	302,900	£16,827	2,366,600	146,399
Germany	1,997,600	81,843	28,390,200	1,622,612
Belgium	438,700	18,783	7,170,700	408,551
France	3,813,700	150,105	27,581,700	1,457,580
Spain	83,300	4,080	1,530,300	102,319
Italy	1,282,200	48,989	12,715,400	668,792
Other European countries	315,300	16,948	3,604,000	248,089
United States	5,306,700	207,838	89,317,700	5,328,319
Canada	32,100	1,218	71,100	3,106
Other countries	100,600	6,049	1,263,000	92,496
Totals	13,673,100	£552,680	181,435,100	£10,570,194
Gutta percha and balata	50,500	2,572	625,400	47,303
Waste and reclaimed rubber	19,100	402	210,800	4,171
Rubber substitutes	......	......	3,700	194
Totals	13,742,700	£555,654	182,275,000	£10,621,862
MANUFACTURED				
*‡Tires and tubes				
Pneumatic				
Outer covers	......	£6,523	......	£117,727
Inner tubes	......	751	......	22,710
Solid tires	......	689	......	2,878
Boots and shoes...*doz. pairs*	1,294	2,835	10,587	19,310
Other rubber manufactures	......	9,339	......	101,168
Totals	......	£20,137	......	£263,793

* After April 12, 1927, tires and tubes imported or exported with complete vehicles or chassis, or fitted to wheels imported separately, are included under complete vehicles or parts.

† Motor cars, motorcycles, parts and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts and accessories were exempt from duty until Apr. 30, 1926, inclusive, and rubber tires and tubes until Apr. 11, 1927, inclusive.

‡Tires and tubes included prior to Apr. 12, 1927.

Tire Production Statistics

	High Pressure Pneumatic Casings					
	Cord			Fabric		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1927	......	21,527,278	21,733,962	......	766,581	1,198,549
1928						
January	3,605,064	1,684,750	1,496,047	200,322	56,218	60,404
February	4,394,561	1,697,498	1,244,812	222,655	53,220	28,719
March	4,355,309	1,564,346	1,302,644	235,673	33,168	28,431
April	4,331,499	1,307,759	1,347,854	223,274	16,198	27,523
May	4,152,775	1,404,097	1,570,710	195,886	6,787	36,567
June	3,362,861	1,345,857	1,812,907	171,349	15,107	38,401
July	3,039,349	1,506,228	2,207,086	113,678	9,285	58,434
August	2,465,358	1,903,345	2,416,386	62,132	20,372	71,856
September	2,339,798*	1,853,887	1,990,535	48,011*	26,931	41,165

	High Pressure Inner Tubes			Balloon Inner Tubes		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1927	......	27,398,535	29,528,108	....	25,718,529	25,143,821
1928						
January	5,328,071	1,669,894	2,014,744	4,408,235	2,411,124	2,539,535
February	5,941,626	1,949,539	1,470,668	5,046,021	3,221,756	2,602,362
March	6,071,983	1,740,238	1,442,162	5,782,551	3,683,017	2,856,342
April	6,044,843	1,628,576	1,459,826	6,434,307	3,366,957	2,815,778
May	6,220,912	1,680,621	1,713,411	7,055,801	3,695,296	3,011,432
June	5,558,455	1,661,897	2,168,337	7,311,204	3,553,191	3,184,056
July	4,435,798	1,764,761	2,970,017	6,794,803	3,240,455	3,576,465
August	3,833,201	2,783,115	3,357,277	6,614,884	3,474,338	3,655,301
September	3,673,789*	2,544,561	2,427,444	6,483,804*	2,782,759	2,938,309

	Balloon Casings			Solid and Cushion Tires		
	Inventory	Production	Total Shipments	Inventory	Production	Total Shipments
1927	....	26,037,452	25,111,903	......	558,030	558,007
1928						
January	3,656,537	2,377,299	2,489,391	161,329	36,279	33,797
February	4,173,493	3,021,548	2,500,013	156,790	36,328	38,715
March	4,700,534	3,516,480	2,967,476	156,424	42,950	44,665
April	4,983,023	3,309,351	2,983,454	154,477	43,255	42,145
May	5,419,093	3,658,349	3,235,236	153,205	46,606	47,604
June	5,587,566	3,658,508	3,486,748	153,925	48,614	48,426
July	5,215,331	3,358,203	3,658,636	150,770	45,792	48,081
August	4,986,800	3,678,139	3,814,016	147,350	51,679	52,334
September	4,935,836*	3,220,369	3,327,028	150,500*	42,619	43,965

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires	
	Cotton Fabric Pounds	Crude Rubber Pounds
1927	177,979,818	463,661,466
1928		
January	16,039,819	43,709,438
February	16,923,607	46,468,050
March	18,853,824	48,897,275
April	18,310,791	43,700,630
May	19,167,606	51,061,030
June	19,646,494	53,158,592
July	20,947,405	47,128,308
August	21,853,756	62,224,046
September	17,796,599	55,351,235

*As of September 30, 1928.
Rubber Association figures representing 75 per cent of the industry.

Plantation Rubber Exports from Malaya*

	January 1 to August 31, 1928		
	From Singapore Tons	From Penang Tons	From Malacca Tons
To United Kingdom	3,624.69	4,365.91	3,664.30
British Possessions	2,270.77	168.00	220.00
Continent of Europe	7,309.80	1,301.67	2,037.11
United States	97,514.35	17,523.49	6,401.09
Japan	10,541.00	1,325.50	1,275.00
Other countries	219.83	....	....
Totals	121,480.44	24,684.57	13,597.50

*Excluding all foreign transhipment.

London Stocks, September, 1928

	Landed for Sept. Tons	Delivered for Sept. Tons	Stocked September 30 1928 Tons	1927 Tons	1926 Tons
LONDON					
Plantation	8,598	9,236	31,334	68.052	34,858
Other grades	10	20	75	120	154
LIVERPOOL					
Plantation	†462	†509	†2,233	†3,269	†1,450
Total tons, London and Liverpool	9,070	9,765	33,642	71,441	36,462

† Official returns from the six recognized public warehouses.

Crude Rubber Arrivals at New York as Reported by Importers

Plantations

Oct. 15. By "Simaloer," Far East.	Cases
H. A. Astlett & Co.	1,046
The Meyer & Brown Corp.	479
The Meyer & Brown Corp.	*153

Oct. 16. By "American Shipper," Europe.	
H. A. Astlett & Co.	1,716
Haldane & Co., Inc.	254

Oct. 16. By "Cedric," London.	
Bierrie & Co., Inc.	137
The Meyer & Brown Corp.	58

Oct. 16. By "Lancastria," London.	
Baird Rubber & Trading Co., Inc.	1,647
Bierrie & Co., Inc.	669
Haldane & Co., Inc.	256
Littlejohn & Co., Inc.	638
The Meyer & Brown Corp.	955
Poel & Kelly, Inc.	707
Chas. T. Wilson Co., Inc.	364

Oct. 16. By "Minnetonka," London.	
General Rubber Co.	11
Haldane & Co., Inc.	405
The Meyer & Brown Corp.	494
Poel & Kelly, Inc.	1,383

Oct. 16. By "Pres. Monroe," Far East.	
H. A. Astlett & Co.	390
Robert Badenhop Corp. ....pkgs.	600
Baird Rubber & Trading Co., Inc.	50
General Rubber Co.	2,502
Haldane & Co., Inc.	504
Haldane & Co., Inc.	*250
Littlejohn & Co., Inc.	4,311
The Meyer & Brown Corp.	2,005
The Meyer & Brown Corp.	*100
Poel & Kelly, Inc.	775
Raw Products Co.	300

Oct. 17. By "Algic," Far East.	
Hood Rubber Co.	95
Chas. T. Wilson Co., Inc.	237

Oct. 19. By "City of Evansville," Far East.	
H. A. Astlett & Co.	2,237
Robert Badenhop Corp. ....pkgs.	1,520
Baird Rubber & Trading Co., Inc.	450
General Rubber Co.	8,188
Haldane & Co., Inc.	606
Hood Rubber Co.	*334
Littlejohn & Co., Inc.	9,761
The Meyer & Brown Corp.	4,122
The Meyer & Brown Corp.	*306
H. Muehlstein & Co., Inc.	1,250
Poel & Kelly, Inc.	1,880
Rogers Brown & Crocker Bros., Inc.	1,230
Rogers Brown & Crocker Bros., Inc.	*500
Chas. T. Wilson Co., Inc.	627

Oct. 19. By "Lycaon," Far East.	
H. A. Astlett & Co.	590
Robert Badenhop Corp. ....pkgs.	705
Baird Rubber & Trading Co., Inc.	75
Bierrie & Co., Inc.	56
N. Diamond & Co., Inc.	150
General Rubber Co.	6,070
Haldane & Co., Inc.	14
Littlejohn & Co., Inc.	3,140
The Meyer & Brown Corp.	582
The Meyer & Brown Corp.	*106
Poel & Kelly, Inc.	928
Poel & Kelly, Inc.	*150
Raw Products Co.	70
Rogers Brown & Crocker Bros., Inc.	200
Chas. T. Wilson Co., Inc.	643

Oct. 19. By "Sac City," Far East.	
General Rubber Co.	805

Oct. 19. By "Volendam," Far East.	
Baird Rubber & Trading Co., Inc.	337
General Rubber Co.	164

Oct. 20. By "Gaasterdyk," Far East.	
Robert Badenhop Corp.	605
General Rubber Co.	1,557
Haldane & Co., Inc.	134
The Meyer & Brown Corp.	1,108

Oct. 20. By "Tymeric," Far East.	
H. A. Astlett & Co.	350
General Rubber Co.	322
Haldane & Co., Inc.	140
Littlejohn & Co., Inc.	1,594
The Meyer & Brown Corp.	164

(continued)	Cases
H. Muehlstein & Co., Inc.	350
Poel & Kelly, Inc.	34
Raw Products Co.	70
Rogers Brown & Crocker Bros., Inc.	100

Oct. 21. By "Pres. Grant," Far East.	
Littlejohn & Co., Inc.	†1,180
Poel & Kelly, Inc.	†200

Oct. 22. By "Breedyk," Far East.	
H. A. Astlett & Co.	1,581
Robert Badenhop Corp. ....pkgs.	231
Bierrie & Co., Inc.	100
General Rubber Co.	4,190
Haldane & Co., Inc.	231
Littlejohn & Co., Inc.	2,639
The Meyer & Brown Corp.	593
The Meyer & Brown Corp.	*136
H. Muehlstein & Co., Inc.	750
Poel & Kelly, Inc.	176
Rogers Brown & Crocker Bros., Inc.	150
Rogers Brown & Crocker Bros., Inc.	*65
Chas. T. Wilson Co., Inc.	376

Oct. 22. By "Caronia," London.	
Bierrie & Co., Inc.	257
Robert Badenhop Corp.	253
General Rubber Co.	300
Littlejohn & Co., Inc.	50
Poel & Kelly, Inc.	520

Oct. 22. By "Matheran," Far East	
General Rubber Co.	2,138
Haldane & Co., Inc.	18
The Meyer & Brown Corp.	211
Poel & Kelly, Inc.	296

Oct. 22. By "Silverhazel," Far East.	
H. A. Astlett & Co.	635
Robert Badenhop Corp. ....pkgs.	1,065
Baird Rubber & Trading Co., Inc.	150
General Rubber Co.	7,845
Haldane & Co., Inc.	955
Littlejohn & Co., Inc.	3,350
The Meyer & Brown Corp.	1,263
The Meyer & Brown Corp.	*50
The Meyer & Brown Corp.	†577
Poel & Kelly, Inc.	1,661
Poel & Kelly, Inc.	*100
Rogers Brown & Crocker Bros., Inc.	350
Chas. T. Wilson Co., Inc.	919

Oct. 23. By "American Banker," London.	
Bierrie & Co., Inc.	260

Oct. 23. By "Minnekahda," London.	
Bierrie & Co., Inc.	317
N. Diamond & Co., Inc.	253
Littlejohn & Co., Inc.	6,288
The Meyer & Brown Corp.	673
H. Muehlstein & Co., Inc.	1,750

Oct. 23. By "Wray Castle," Far East.	
H. A. Astlett & Co.	1,423
Robert Badenhop Corp.	509
Baird Rubber & Trading Co. Inc.	300
General Rubber Co.	6,360
Haldane & Co., Inc.	280
Littlejohn & Co., Inc.	5,581
The Meyer & Brown Corp.	2,724
H. Muehlstein & Co., Inc.	2,200
Poel & Kelly, Inc.	459
Rogers Brown & Crocker Bros., Inc.	627
Chas. T. Wilson Co., Inc.	730

Oct. 24. By "Caucasier," Europe.	
General Rubber Co.	355

Oct. 26. By "Royal Prince," Far East.	
H. A. Astlett & Co.	568
Robert Badenhop Corp.	676
General Rubber Co.	2,661
Haldane & Co., Inc.	250
Littlejohn & Co., Inc.	4,830
The Meyer & Brown Corp.	1,722
The Meyer & Brown Corp.	*403
H. Muehlstein & Co., Inc.	500
Poel & Kelly, Inc.	1,455
Rogers Brown & Crocker Bros., Inc.	300
Rogers Brown & Crocker Bros., Inc.	*250
Chas. T. Wilson Co., Inc.	599

Oct. 27. By "Kabinga," Far East.	
General Rubber Co.	114
Hood Rubber Co.	*63
Littlejohn & Co., Inc.	524
Poel & Kelly, Inc.	254
Chas. T. Wilson Co., Inc.	75

Oct. 27. By "Lepanto," London.	
N. Diamond & Co., Inc.	345
Haldane & Co., Inc.	205

Oct. 27. By "Missouri," London.	Cases
Baird Rubber & Trading Co., Inc.	*253
H. Muehlstein & Co., Inc.	*750

Oct. 29. By "City of Baroda," Far East.	
Bierrie & Co., Inc.	112
Littlejohn & Co., Inc.	720
The Meyer & Brown Corp.	160
Chas. T. Wilson Co., Inc.	86

Oct. 29. By "Veendam," Far East.	
Robert Badenhop Corp.	252
Baird Rubber & Trading Co., Inc.	325
N. Diamond & Co., Inc.	104
Haldane & Co., Inc.	97
Littlejohn & Co., Inc.	2,372
The Meyer & Brown Corp.	646
Poel & Kelly, Inc.	50

Oct. 30. By "Bowes Castle," Far East.	
H. A. Astlett & Co.	735
Robert Badenhop Corp. ....pkgs.	514
Bierrie & Co., Inc.	132
General Rubber Co.	2,514
Haldane & Co., Inc.	250
Littlejohn & Co., Inc.	2,770
The Meyer & Brown Corp.	844
H. Muehlstein & Co., Inc.	200
Poel & Kelly, Inc.	630
Chas. T. Wilson Co., Inc.	70

Oct. 30. By "London Merchant," Europe.	
H. A. Astlett & Co.	153
Bierrie & Co., Inc.	282
Littlejohn & Co., Inc.	284
The Meyer & Brown Corp.	1,044

Oct. 30. By "Minnewaska," London.	
Robert Badenhop Corp.	150
Bierrie & Co., Inc.	147
General Rubber Co.	1,023
Littlejohn & Co., Inc.	514
The Meyer & Brown Corp.	402
H. Muehlstein & Co., Inc.	250
Poel & Kelly, Inc.	50

Oct. 30. By "Pres. Wilson," Far East.	
H. A. Astlett & Co.	933
Robert Badenhop Corp. ....bales	60
General Rubber Co.	1,540
Haldane & Co., Inc.	1,150
Haldane & Co., Inc.	**[illegible]
Littlejohn & Co., Inc.	[illegible]
The Meyer & Brown Corp.	[illegible]
The Meyer & Brown Corp.	[illegible]
H. Muehlstein & Co., Inc.	[illegible]
Poel & Kelly, Inc.	[illegible]
Chas. T. Wilson Co., Inc.	[illegible]

Oct. 30. By "Sawokla," Far East.	
Chas. T. Wilson Co., Inc.	41

Oct. 31. By "Celtic," Europe.	
H. A. Astlett & Co.	115

Oct. 31. By "Tuscania," London.	
Poel & Kelly, Inc.	540
Chas. T. Wilson Co., Inc.	397

Nov. 2. By "Bellepline," Europe.	
Robert Badenhop Corp.	524

Nov. 3. By "Montclare," Europe.	
Robert Badenhop Corp.	**113

Nov. 3. By "Silverfir," Far East.	
Robert Badenhop Corp.	†134
Bierrie & Co., Inc.	136

Nov. 4. By "Bengkalis," Far East.	
The Meyer & Brown Corp.	†100

Nov. 4. By "Bilderdyk," Far East.	
Hood Rubber Co.	*80

Nov. 4. By "Pres. Cleveland," Far East.	
Littlejohn & Co., Inc.	†1,115
The Meyer & Brown Corp.	†275
Poel & Kelly, Inc.	†275

Nov. 5. By "Carmania," London.	
Bierrie & Co., Inc.	429
The Meyer & Brown Corp.	793

Nov. 5. By "Ryndam," Far East.	
Poel & Kelly, Inc.	169

Nov. 5. By "Scythia," London.	
Bierrie & Co., Inc.	65

Nov. 6. By "American Farmer," Europe.	
The Meyer & Brown Corp.	522

Nov. 7. By "Golden Sun," Far East.	
The Meyer & Brown Corp.	†168

Nov. 7. By "Minnesota," Europe.	
General Rubber Co.	1,073
H. Muehlstein & Co., Inc.	276
Poel & Kelly, Inc.	785
Chas. T. Wilson Co., Inc.	271

* Arrived at Boston.
† Arrived at Los Angeles.
** Arrived at Canada.

Nov. 7. By "Muncaster Castle," Far East.	Cases
H. A. Astlett & Co.	1,574
Robert Badenhop Corp. ....pkgs.	210
Baird Rubber & Trading Co., Inc.	275
General Rubber Co.	8,756
Haldane & Co., Inc.	1,550
Hood Rubber Co.	153
Littlejohn & Co., Inc.	2,445
The Meyer & Brown Corp.	1,551
H. Muehlstein & Co., Inc.	2,500
Poel & Kelly, Inc.	2,101
Poel & Kelly, Inc.	*110
Rogers Brown & Crocker Bros., Inc.	660
Rogers Brown & Crocker Bros., Inc.	*66
Chas. T. Wilson Co., Inc.	250

Nov. 7. By "Myrtlebank," Far East.	
H. A. Astlett & Co.	360
Robert Badenhop Corp.	260
Baird Rubber & Trading Co., Inc.	25
Bierrie & Co., Inc.	232
General Rubber Co.	1,567
Haldane & Co., Inc.	247
Littlejohn & Co., Inc.	710
The Meyer & Brown Corp.	600
H. Muehlstein & Co., Inc.	400
Poel & Kelly, Inc.	250
Raw Products Co.	30

Nov. 10. By "Rotterdam," Far East.	
Poel & Kelly, Inc.	262

Nov. 11. By "Elmbank," Far East.	
General Rubber Co.	840
Hood Rubber Co.	*33
Littlejohn & Co., Inc.	1,875
H. Muehlstein & Co., Inc.	168
Poel & Kelly, Inc.	50
Rogers Brown & Crocker Bros., Inc.	50
Chas. T. Wilson Co., Inc.	942

Nov. 11. By "Golden Tide," Far East.	
The Meyer & Brown Corp.	†250

Nov. 11. By "Maryland," Europe.	Cases
Littlejohn & Co., Inc.	419
H. Muehlstein & Co., Inc.	276
Poel & Kelly, Inc.	*299

Nov. 11. By "Wisconsin," Far East.	
The Meyer & Brown Corp.	†120

Nov. 12. By "Aurania," Europe.	
Robert Badenhop Corp. ....pkgs.	**158

Nov. 12. By "Carinthia," London.	
Bierrie & Co., Inc.	216

Nov. 12. By "City of Salisbury," Far East.	
H. A. Astlett & Co.	2,967
Robert Badenhop Corp. ....pkgs.	273
Baird Rubber & Trading Co., Inc.	150
Bierrie & Co., Inc.	384
General Rubber Co.	10,648
Haldane & Co., Inc.	2,317
Hood Rubber Co.	146
Littlejohn & Co., Inc.	3,694
The Meyer & Brown Corp.	1,782
H. Muehlstein & Co., Inc.	1,600
Poel & Kelly, Inc.	1,203
Rogers Brown & Crocker Bros., Inc.	1,493
Rogers Brown & Crocker Bros., Inc.	*322
Chas. T. Wilson Co., Inc.	523

Nov. 12. By "Lancastria," London.	
H. A. Astlett & Co.	265
General Rubber Co.	3,951
Haldane & Co., Inc.	260
Littlejohn & Co., Inc.	261

Nov. 12. By "Minnetonka," London.	
Poel & Kelly, Inc.	501

Nov. 13. By "Masirah," Far East.	
General Rubber Co.	482
Hood Rubber Co.	*85
The Meyer & Brown Corp.	310
H. Muehlstein & Co., Inc.	112
Chas. T. Wilson Co., Inc.	165

Nov. 14. By "Pres. Van Buren," Far East.	Cases
Robert Badenhop Corp.	50
Baird Rubber & Trading Co., Inc.	150
Haldane & Co., Inc.	150
Hood Rubber Co.	50
Littlejohn & Co., Inc.	1,441
The Meyer & Brown Corp.	958
H. Muehlstein & Co., Inc.	400
Poel & Kelly, Inc.	1,095
Rogers Brown & Crocker Bros., Inc.	950
Rogers Brown & Crocker Bros., Inc.	*300
Chas. T. Wilson Co., Inc.	431

Nov. 14. By "Silverash," Far East.	
Hood Rubber Co.	*200

Nov. 15. By "Pres. Pierce," Far East.	
Haldane & Co., Inc.	†600
Littlejohn & Co., Inc.	†332

Africans

Nov. 6. By "Sarcoxie," Europe.	
Littlejohn & Co., Inc.	610

Balata

Oct. 26. By "Stephen," South America.	
Paul Bertuch & Co., Inc.	79
General Rubber Co.	9

Nov. 7. By "Berury," South America.	
Paul Bertuch & Co., Inc.	31

Nov. 7. By "Prins Frederick Hendrick," South America.	
Middleton & Co., Ltd. ....bales	100

Nov. 7. By "Swinburne," South America.	
Paul Bertuch & Co., Inc.	7

Rubber Latex

Oct. 30. By "Bowes Castle," Far East.	
General Rubber Co. ....gals.	126,104

Paras and Caucho

	Fine Cases	Medium Cases	Coarse Cases	Caucho Cases	Miscel. Cases
Oct. 16. By "American Shipper," Europe.					
A. Astlett & Co.	485	4	19	23	...
. 26. By "Bangu," South America.					
Astlett & Co.	64	...	73	73	...
Rubber Co.	...	...	35	...	...
26. By "Stephen," South America.					
Astlett & Co.	...	...	73	146	...
ul Bertuch & Co., Inc.	548	...	...	...	...
General Rubber Co.	378	7	57	...	...
The Meyer & Brown Corp.	375	...	...	...	...
Nov. 6. By "South Cross," South America.					
Paul Bertuch & Co., Inc.	189	...	12	...	...
Nov. 7. By "Berury," South America.					
H. A. Astlett & Co.	5	9	12	74	...
Paul Bertuch & Co., Inc.	...	...	...	31	...
Nov. 7. By "Swineburne," South America.					
H. A. Astlett & Co.	12	...	93	219	...
Paul Bertuch & Co., Inc.	182	...	...	...	...
General Rubber Co.	263	...	136	...	...
Littlejohn & Co., Inc.	107	...	...	...	...
The Meyer & Brown Corp.	63	...	...	...	...

United States Crude and Waste Rubber Imports for 1928 by Months

	Plantations	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Total 1928	Total 1927	Balata	Miscellaneous	Waste
January ....tons	43,668	1,580	433	126	435	1	46,243	45,827	120	1,292	248
February	27,852	756	125	125	587	..	29,445	27,701	58	517	310
March	37,545	2,430	72	92	755	..	40,894	35,054	154	741	830
April	36,108	573	15	20	524	..	37,240	48,632	202	888	18
May	31,564	849	14	5	451	..	32,883	36,285	71	923	142
June	24,752	582	25	9	424	..	25,792	33,142	14	727	165
July	32,536	585	11	62	188	..	33,382	38,416	108	895	33
August	28,675	1,010	105	15	...	..	29,805	32,804	62	775	219
September	45,663	731	262	6	...	..	46,662	32,810	107	961	109
October	41,571	884	37	23	...	..	42,515	31,498	118	785	97
Total, ten months, 1928 ....tons	349,934	9,980	1,099	483	3,364	1	364,861	....	1,014	8,504	2,171
Total, ten months, 1927 ....tons	341,185	14,051	1,499	1,252	4,151	31	....	362,169	742	10,732	4,751

Compiled from statistics supplied by the Rubber Association of America, Inc.

Zinc Oxide for Rubber Compounding[1]

There is a definite trend toward a more careful control of the furnaces so as to produce oxide which is better suited physically for specific uses, particularly rubber, while there has been a noticeable improvement recently in the color and smoothness of paint grades.

Rubber manufacturers continue to be the largest consumers of zinc oxide. A better understanding of the chemical action of zinc oxide in compounded rubber, together with its well-known ability to produce a rubber which will withstand heavy and rapidly repeated shocks without dangerous heating, has somewhat stabilized its position as a rubber reinforcing agent. However, its high volume cost as compared with other reinforcing pigments and with rubber itself still makes zinc oxide the target for all cost cutting campaigns.

[1] Singmaster and Bryer, "Annual Survey of American Chemistry, 1928," p. 117.

German Tire Output Increases

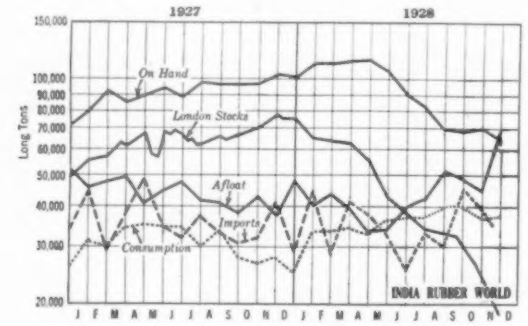
A 76 per cent increase for 1927 over 1926 was made in German tire production, according to *Commerce Reports.* Due to heavy increase in motor traffic, increased consumption kept pace with increased production. Competition with foreign tires and the drop in rubber cost caused sharp price reductions. A marked improvement in quality is credited with increasing demand for domestic products. Of tires imported by Germany the United States supplied 51½ per cent of the total in 1927 and kept up this lead in the first half of 1928.

British Malaya's Rubber Imports

Like carrying coals to Newcastle, $170,570,000 worth of rubber was brought to British Malaya in 1927, chiefly from Siam and the Dutch East Indies, and was almost wholly re-exported from Singapore.

Imports, Consumption and Stocks

The accompanying graph covers crude rubber importations, consumption and stocks for 1927 and the first 11 months of 1928. Stocks on hand October 31 were 68,000 tons, practically the same



U. S. Imports, Consumption and Stocks

as on September 30. Consumption during October was 40,847 tons. This is equal to the heaviest consumption of any month thus far this year. The estimated consumption for November is placed at 38,000 tons in anticipation of a possible slight decrease in tire and tube output.

London stocks decreased between October 27 and November 24, on the former date being 24,277 tons and on the latter 18,724, a decrease of 5,553 tons.

Twelve Months	Imports Tons	Consumption Tons	Stocks: On Hand Tons	Stocks: Afloat Tons	London Tons	Singapore and Penang Tons
1925	384,837	389,136	51,000*	48,000*	.....	.....
1926	411,900	366,140	72,510*	52,019*	.....	.....
1927	426,258	370,915	100,130*	47,939*	63,207*	25,868*
1928						
January	46,200	34,403	110,114	41,256	66,285	25,868
February	29,445	33,703	108,955	43,316	62,500	22,867
March	40,894	35,688	114,061	39,324	61,000	20,538
April	37,240	32,779	113,800	33,986	55,000	16,946
May	32,883	37,333	105,356	34,374	43,716	17,687
June	25,792	37,676	90,189	40,000	35,248	18,207
July	33,382	37,407	83,242	42,304	35,445	18,663
August	29,805	42,925	68,994	51,875	31,884	18,971
September	46,662	39,882	68,881	48,566	31,462	14,898
October	42,515	40,847	66,421	41,571	24,240	.....
Nov. (est.)	36,000	38,000	64,000	70,000	18,724†	.....

*December 31.

†November 24.

The 1928 figures, unless otherwise specified, are all as of the first of each month.

Netherland East Indies Exports

	Long Tons—1928: March	April	May	June	July	Aug.	Total Jan.-Aug.: 1927	1928
Java & Madura	4,017	3,993	4,960	5,447	5,615	5,677	37,968	38,640
Sumatra E. C.	5,900	5,273	5,564	6,104	8,417	8,287	49,670	52,285
Other N. E. I.*								
Atjeh & Dep.	404	201	332	331	290	324	2,490	2,556
Riouw & Dep.	624	467	981	765	1,079	938	7,526	6,449
Djambi	2,799	1,686	3,606	5,921	2,327	2,289	22,138	23,658
Palembang	1,263	476	1,340	1,950	2,059	2,002	14,134	12,562
Lampongs	309	200	275	253	249	237	1,838	1,947
Benkoelen	3	6	3	5	4	3	53	30
Sumatra W. C.	117	42	28	38	53	124	1,030	753
Tapancelo	412	343	417	394	504	558	4,906	3,656
Banka & Dep.	41	30	37	42	59	66	1,430	489
Billiton	9	3	2	4	9	11	116	63
W. Bor.	1,553	669	1,662	1,999	2,119	2,215	17,056	13,267
S. & E. Bor.	2,133	1,355	1,726	1,930	2,811	3,113	17,856	17,573
Menado	12	17	16	15	28	12	127	138
Celebes & Dep.	8	5	2	2	2	8	4	30
Amboina	3	3	1	2	2	2	29	20
Total*	9,690	5,503	10,428	13,651	11,595	11,902	90,733	83,191
Grand total	19,607	14,769	20,952	25,202	25,627	25,866	178,341	174,116

*Exports from "Other N. E. I." consist mostly of native rubber of approximately 33⅓ per cent necessary for moisture.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Production—Net Exports

British Malaya:	Long Tons—1928: April	May	June	July	Aug.	Sept.	Oct.
Gross exports	20,029	26,403	22,930	30,405	35,593	29,700	24,441
Imports	9,335	10,350	16,168	13,383	15,114	11,239	12,603
Net	10,694	16,053	6,762	17,022	20,479	18,461	11,838
Ceylon	3,460	3,125	3,125	4,798	5,580	4,687	.....
India and Burma	789	654	963	1,043	398	457	.....
Sarawak	630	842	926	905	1,227	938	949
B. N. Borneo	*500	*500	*500	*500	*500	*500	*500
Siam	258	241	451	366	544	447	457
Java and Madura	3,993	4,943	5,419	5,602	5,668	4,956	.....
Sumatra East Coast	5,040	5,355	5,863	7,566	7,438	6,536	.....
Other N. E. Indies	5,538	10,382	13,623	11,424	11,798	9,791	.....
French Indo-China	518	619	902	744	779	1,112	566
Other America	239	51	57	101	76	75	.....
Amazon Valley	1,014	2,062	1,399	1,264	1,732	1,614	1,399
Mexican Guayule	512	452	424	192	.....	.....	.....
Africa	572	623	479	580	374	419	.....
Total	33,757	45,902	40,893	52,107	56,593	49,993	.....

*Estimated.

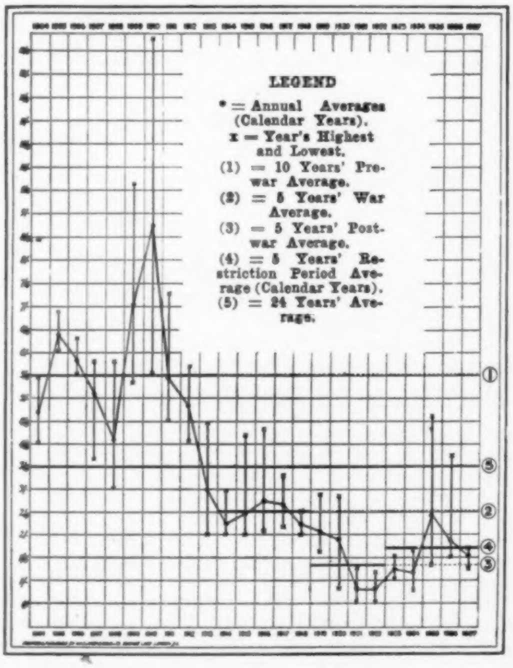
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Absorption—Net Imports

	Long Tons—1928: March	April	May	June	July	Aug.	Sept.
Australia	918	832	655	348	591	707	603
Belgium	816	575	746	743	895	519	597
Canada	2,989	1,938	2,180	2,632	2,692	2,447	2,810
Czechoslovakia	398	*159	213	182	384	94	.....
Denmark	33	23	61	28	35	47	53
Finland	78	63	71	58	50	59	64
France	1,902	2,204	3,210	4,550	2,652	3,587	.....
Germany	3,521	2,719	2,944	2,968	3,387	2,744	3,553
Italy	763	1,115	1,095	984	1,598	875	.....
Japan	1,707	2,353	2,306	2,119	2,042	1,883	.....
Netherlands	95	280	209	133	395	316	345
Norway	56	60	82	33	32	33	74
Russia	1,468	926	744	710	660	5	.....
Spain	497	304	220	251	175	58	.....
Sweden	184	193	271	227	177	220	186
United Kingdom	3,179	*2,280	*5,325	*3,031	*1,374	48	4,199
United States	36,900	35,663	28,659	25,143	28,170	28,827	36,797
U. S. (Guayule)	575	512	452	424	192	.....	.....
Total	56,079	52,199	49,443	44,564	45,501	42,469	.....

*Excess of Reexports over Imports.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.



Courtesy *India Rubber J.*

Highest, Lowest and Average London Spot Prices First Grade Plantation Rubber